Toxic Air Contaminant Control Program

ANNUAL REPORT
2001
Volume I

BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

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

July 2003

TABLE OF CONTENTS

The Toxic Air Contaminant Control Program Annual Report is published to provide the public with information regarding the Bay Area Air Quality Management District's programs to identify and reduce ambient concentrations of toxic air contaminants (TACs). The 2001 report summarizes the status of the programs (as of the report publication date) that are used to identify and control ambient levels of TACs from stationary sources, and contains summaries of the TAC emissions inventory and ambient monitoring network for 2001.

Air Toxics New Source Review: New and modified source permit applications have been reviewed for air toxics concerns since 1987, in accordance with the Risk Management Policy established at the request of the District's Board of Directors. A large increase in risk screening analyses has occurred in recent years due primarily to the removal of permit exemptions in District regulations for standby engines. Prior to 2000, the District completed risk screens for an average of about 175 permit applications per year. This number increased to 255 in 2000, to 440 in 2001, and to 602 in 2002.

Air Toxics Hot Spots Program: The Air Toxics Hot Spots (ATHS) Program involves the evaluation of health risks due to routine and predictable TAC emissions from industrial and commercial facilities. The District has established specific public notification measures for various levels of risk identified under the program (Levels 1, 2, and 3). In 1991, the first year of the risk assessment phase of the program, 30 facilities were identified with health risks of Level 1 or greater which triggered public notification requirements. The number of facilities requiring public notification has steadily decreased in recent years as industries continue efforts to reduce emissions and refine estimates of risk. There are currently no facilities in the Bay Area that require public notification under the ATHS Program. Although some dry cleaners and gasoline stations have Level 1 risks, they have not been included on the notification list because they are being considered in an industrywide risk assessment.

In addition to public notification requirements, the ATHS Program requires facilities to reduce their health risks below levels determined by the air district to be significant within a certain timeframe. The District requires mandatory risk reduction measures for facilities with health risks of Level 2 or greater (maximum cancer risks of 100 in one million or greater). There are no facilities in the Bay Area that have risks identified as Level 2 or greater.

Control Measures for Categories of Sources: Eleven stationary source Airborne Toxic Control Measures (ATCMs) have been fully implemented in the Bay Area through the State Toxic Air Contaminant Control Program. In addition, an ATCM on residential waste burning was adopted by the California Air Resources Board (CARB) in 2002, and will go into effect on January 1, 2004. CARB has begun rule development activities for two additional ATCMs intended to reduce diesel particulate matter from stationary engines, and

formaldehyde from composite wood products. CARB is also re-evaluating the existing ATCMs for chrome plating and chromic acid anodizing operations, and perchloroethylene dry cleaners.

National Emission Standards for Hazardous Air Pollutants (NESHAPs) developed by U.S. EPA in accordance with Title III of the 1990 federal Clean Air Act Amendments have also become an important source of air toxics control measures in California. These rules focus on larger "major source" facilities, and require that emissions be reduced using the Maximum Achievable Control Technology (MACT). Under State law, the District must implement and enforce all MACT Standards, or rules that are at least as stringent. U.S. EPA has already adopted a significant number of new MACT Standards, with the last group expected to be adopted by early 2004. Table 2a shows the NESHAPs that have already been adopted, and Table 2b shows the remaining rules that are scheduled for adoption. Beyond 2004, the focus of NESHAP development under Title III will shift to rules that apply to smaller "area source" facilities.

Emissions Inventory: The 2001 emissions inventory continues to show decreasing emissions of many TACs in the Bay Area. The most dramatic emission reductions in recent years have been for certain chlorinated compounds that are used as solvents including 1,1,1-trichloroethane and perchloroethylene.

Ambient Monitoring Network: Table 3 contains a summary of average ambient concentrations of TACs measured at monitoring stations in the Bay Area by the District in 2001. Table 4 and Figure 2 show the calculated cancer risks associated with lifetime exposure to average ambient concentrations of these measured TACs. Of the pollutants for which monitoring data are available, 1,3-butadiene and benzene (which are emitted primarily from motor vehicles) account for over one half of the average calculated cancer risk.

Ambient benzene levels declined dramatically in 1996 with the advent of Phase 2 reformulated gasoline, with significant reductions in ambient 1,3-butadiene levels also occurring. Due largely to these observed reductions in ambient benzene and 1,3-butadiene levels, the calculated network average cancer risk has been significantly reduced in recent years. Based on 2001 ambient monitoring data, the calculated inhalation cancer risk is 173 in one million, which is 43 percent less than what was observed in 1995. These figures do not include the risk resulting from exposure to diesel particulate matter. Although not specifically monitored, recent studies indicate that exposure to diesel particulate matter may contribute to a cancer risk that is greater than all of the other measured TACs combined.

Since 1987, the Bay Area Air Quality Management District has had a program to describe, control, and where possible, eliminate public exposure to airborne toxic compounds. This report updates the status of program activities, and summarizes data collected during 2001.

The air toxics program is distinct from the District's efforts to control ambient levels of the "criteria pollutants" (e.g., carbon monoxide, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide). The State and federal government have set health-based ambient air quality standards for criteria pollutants. The air toxics program was established as a separate and complementary program designed to evaluate and reduce adverse health effects resulting from exposure to toxic air contaminants (TACs).

The District works to understand and to control both locally elevated concentrations (i.e., "Hot Spots") and ambient background concentrations of TACs. The major elements of the District's air toxics program are:

- **Preconstruction review of new and modified sources** for potential health impacts, and the requirement for new/modified sources with non-trivial TAC emissions to use the Best Available Control Technology.

- **The Air Toxics Hot Spots Program**, designed to identify industrial and commercial facilities that may result in locally elevated ambient concentrations of toxic air contaminants, to report significant emissions to the affected public, and to reduce unacceptable health risks.

- **Control measures** designed to reduce emissions from source categories of TACs, including rules originating from the State Toxic Air Contaminant Act and the federal Clean Air Act.

- **The toxic air contaminant emissions inventory**, a database that contains information concerning routine and predictable emissions of TACs from permitted stationary sources.

- **Ambient monitoring** of toxic air contaminant concentrations at a number of sites throughout the Bay Area.

This report describes the elements of the District's air toxics program and discusses changes that have occurred during the past year. The Appendices contain the District's 2001 annual air toxics emissions inventory, and data from the District's air toxics monitoring network collected in 2001.

The urban background of toxic air contaminants is the combined result of many diverse human activities. In general, the stationary sources for which the District has primary

regulatory jurisdiction contribute less significantly to health risks than do mobile sources. The District's program therefore focuses not only on strategies for reducing emissions from stationary sources, but also on promotion of similar strategies for mobile sources and other types of sources not directly influenced by District regulations and policies.

The District evaluates permit applications for new and modified stationary sources of air pollutants. Since 1987, that review has included an analysis of potential health risks resulting from emissions of TACs based on the Risk Management Policy established at the request of the District's Board of Directors. The goal of this program is to ensure that the health risks associated with TAC emissions from proposed projects are acceptable. In addition, net health risk benefits are realized when older, more highly polluting, sources are replaced or modified and must meet more stringent control requirements.

The requirements of Air Toxics New Source Review (NSR) are based on the results of Health Risk Screening Analysis (HRSA), an assessment that describes the possible adverse health effects which may result from public exposure to routine emissions of toxic air contaminants. HRSAs do not address any adverse health effects that may result from accidental releases of toxic compounds. In California, review of industry's preparation for, and protection from, accidental releases is performed by Certified Unified Program Agencies or Administering Agencies.

All permit applications for new and modified sources are screened for emissions of TACs. If any TAC is emitted in amounts that exceed specified de minimus levels, District staff completes an HRSA using computer-modeled estimates of atmospheric dispersion. An HRSA may be a conservative screening-level analysis, or a more refined analysis involving the use of various site-specific data (e.g., the use of actual meteorological data).

Where the predicted health risks from a proposed project exceed specified threshold levels, the new/modified source(s) must use the Best Available Control Technology to minimize TAC emissions (TBACT). If the residual health risks, after TBACT is applied, result in risks that exceed significance levels established for the overall acceptability of a project, then other risk reduction measures may be required, or the permit(s) for the proposed source(s) may be denied. In the vast majority of cases, the use of emissions control technology and other available risk reduction measures are successful in reducing the health risks associated with the proposed project’s emissions to acceptable levels.

Prior to 2000, the District completed HRSAs for an average of about 175 permit applications per year. This number increased to 255 in 2000, to 440 in 2001, and to 602 in 2002. The large increase in the number of HRSAs completed in recent years is due primarily to the elimination of permit exemptions for certain sources, particularly engines that are used to supply backup power in the event of an emergency.

In May and June of 2003, the District held public workshops on a proposal to codify the Air Toxics NSR Program into a rule that would be adopted by the District’s Board of Directors. The proposed rule would update and enhance program requirements primarily to increase conformity with updated State guidelines. The rule development process is expected to be completed in early 2004.

AIR TOXICS HOT SPOTS PROGRAM

Assembly Bill 2588, the Air Toxics "Hot Spots" Information and Assessment Act, was enacted by the State legislature in 1987. AB-2588 requires companies throughout California to provide information to the public about emissions of TACs, and the impact that those emissions may have on public health.

There are four steps to implementing the Air Toxics Hot Spots (ATHS) Program established under AB-2588. In the first step, an air toxics emissions inventory is prepared for each facility in the Bay Area that has operating permits from the District. This inventory lists the emissions of TACs from each source based upon information supplied to the District by the affected facility and reviewed by District engineers.

In the second step of the ATHS Program, the District prioritizes facilities for additional scrutiny. The prioritization procedure considers the quantity and toxicity of pollutants emitted, and the proximity of persons that may live or work nearby. Each facility is categorized as high, medium or low priority. High priority facilities are required to prepare a facility-wide Health Risk Assessment (HRA). The fact that a facility has been identified as high priority does not necessarily mean that nearby persons are at increased risk from the facility's air emissions. Rather, a designation of high priority indicates that the facility emissions need to be analyzed in more detail.

The third step of the ATHS Program provides this additional analysis by means of completion and review of a comprehensive HRA. In the fourth step, the ATHS Program requires that exposed persons be notified regarding the results of an HRA if, in the judgment of the District, the calculated risks warrant such notification. Affected facilities are required to notify their neighbors of the results of an HRA through direct mail to households and through public meetings in accordance with notification procedures developed by the District. The District established specific public notification measures for various levels of risk identified under the program (Levels 1, 2, and 3).

The first cycle of the District's ATHS Program was completed in January 1991, with the submission of risk assessment documents by the first group of high priority facilities identified during the inventory phase of the program. Of the 123 HRAs submitted, 30 were Level 1 or greater (maximum cancer risks greater than or equal to 10 in one million), and therefore were required to engage in the public notification. In 1992, the number of Level 1 or greater facilities was reduced to 16. All Level 2 and 3 risks (100 in one million or greater) were reduced to Level 1 or lower by 1993.

Continued efforts to reduce emissions and to refine estimates of risk reduced the number of facilities requiring public notification to nine in 1993, to five in 1994, to two in 1995, and to one in 1999. The last facility requiring public notification under the ATHS Program in the Bay Area was removed at the end of 2001, as a revised HRA submitted by the facility indicated that risks had been reduced to Level 0. The current ATHS Program public notification list is given in Table 1.

The ATHS Program requires air districts to maintain their toxics inventories, revising them on at least a quadrennial basis. In the Bay Area, emission inventories are updated annually for most sources of TACs through the District's ongoing permit renewal process. This annual update is used to re-prioritize the facilities in the program, thus allowing for identification of any new facilities or significant increases in emissions at existing facilities. In this way, an additional 16 facilities have been identified as high priority since the first cycle of health risk assessments were completed in 1991. The HRAs prepared for all of these facilities indicated that the maximum health risks are below the public notification thresholds.

Dry cleaning facilities were removed from the public notification list in 1994. These sources, as well as gasoline dispensing facilities, are being evaluated in an "industrywide" HRA on a statewide basis as a part of the ATHS Program. The industrywide HRA completed for these facilities indicates that some of these facilities have Level 1 health risks.

In 1992, the ATHS Program was amended with the passage of SB-1731. This legislation requires facilities to implement measures to reduce risks below levels determined by the District to be significant within a certain timeframe. The District requires mandatory risk reduction measures under the authority of SB-1731 for facilities with health risks of Level 2 or greater (maximum cancer risks of 100 in one million or greater). In 1994, the District adopted Regulation 11, Rule 16, Perchloroethylene and Synthetic Solvent Dry Cleaning Operations, which incorporated the risk reduction requirements of SB-1731 because many dry cleaners had been identified as having risks of Level 2 or greater. The risk reduction measures required by this rule have been fully implemented, and the health risks from all permitted dry cleaners have been reduced to Level 1 or lower. There are currently no facilities in the Bay Area (including dry cleaners and gasoline dispensing facilities) that have been identified as having Level 2 risks or greater requiring mandatory risk reduction measures under the ATHS Program.

SB-1731 also directed OEHHA to prepare new risk assessment guidelines for use in the ATHS Program. These guidelines, in several sections, are currently being developed by OEHHA. The sections include guidelines for assessing the impacts of acute and chronic exposures, guidelines for estimating risks due to carcinogens, and guidelines for inclusion of stochastic modeling in risk assessments. The guidelines must receive public review and examination by the Scientific Review Panel before being adopted by OEHHA. The OEHHA risk assessment guideline revisions are expected to be completed in 2003.

CONTROL MEASURES FOR CATEGORIES OF SOURCES

The primary mechanism for the development of retrofit air toxics control measures in California has been through the Toxic Air Contaminant Act, which was enacted in 1983 with the passage of AB-1807. Under this legislation, Airborne Toxic Control Measures (ATCMs) adopted by the California Air Resources Board (CARB) are implemented and enforced by the local air districts. Eleven statewide ATCMs have been fully implemented in the Bay Area covering the following source categories: chrome plating and anodizing operations; cooling towers; commercial and hospital sterilizers; medical waste incinerators; surfacing applications that use serpentine materials; gasoline stations; perchloroethylene dry cleaners; non-ferrous metal melting operations; chlorinated TACs from automotive maintenance and repair activities; construction, grading, quarrying, and surface mining operations in areas with serpentine deposits; and motor vehicle and mobile equipment coating operations.

An ATCM for residential waste burning was adopted by CARB in 2002, and will go into effect on January 1, 2004. CARB has also begun rule development activities for several additional ATCMs. New ATCMs are proposed to reduce diesel particulate matter from stationary and portable engines, and formaldehyde from composite wood products. CARB is also re-evaluating the existing ATCMs for chrome plating and chromic acid anodizing operations, and perchloroethylene dry cleaners.

In addition to the ATCMs, another source of new air toxics control measures are the National Emission Standards for Hazardous Air Pollutants (NESHAPs) developed by the U.S. EPA. These federal rules are also commonly referred to as MACT Standards, because they reflect the Maximum Achievable Control Technology. The MACT Standards focus primarily on controlling emissions from facilities that are "major sources" of hazardous air pollutants (HAPs). A major source of HAPs is a facility that emits, or has the potential to emit, 10 tons per year or more of any individual HAP, or 25 tons per year or more of any combination of HAPs. Table 2a lists the MACT Standards that have already been adopted by U.S. EPA, and Table 2b lists the remaining MACT Standards scheduled for adoption. The District is required to implement and enforce all MACT Standards, or rules that are at least as stringent.

All of the listed MACT Standards are expected to be adopted by early 2004, after which the focus of the federal air toxics program will shift towards the development of control measures that apply to "area sources" of HAPs. An area source of HAPs is a facility that emits one or more HAP, but in quantities less than the major source thresholds. The U.S. EPA has listed a total of 56 area source categories that are slated for NESHAP development.

AIR TOXICS EMISSIONS INVENTORY

The air toxics emissions inventory is a database that contains information concerning emissions of TACs from permitted stationary sources in the Bay Area. The inventory includes routine or predictable releases, and is not intended to describe the potential for acute hazards from accidental releases. Information submitted by industry is reviewed for accuracy by District staff prior to inclusion in the inventory. This inventory, and a similar inventory for mobile and area sources compiled by CARB, is used to plan strategies to reduce public exposure to TACs.

The detailed emissions inventory data for 2001 are provided in Volume II of this Report. The data are provided for each facility sorted by county and city (Appendix B-1), and alphabetically by pollutant (Appendix B-2). The total inventory for the Bay Area is provided by county (Appendix B-3), and by pollutant sorted in several different ways (Appendix B-4). These are the District's best estimates of TAC emissions, based on the information that facilities submitted in their most recent annual update reports that were entered into the District's Data Bank prior to December 31, 2001.

Emission thresholds above which emissions are reported have been established individually for each TAC based on relative toxicity. The reporting thresholds reflect the emission level that is estimated to result in a de minimus level of health risk based on a series of conservative risk assessment assumptions (e.g., lifetime exposure, screening modeling methods, low-level stack release located in close proximity to receptors). For carcinogens, the threshold reporting levels have been set at the emission level that corresponds to a maximum cancer risk of 1 in one million. Non-carcinogen trigger levels represent the amount estimated to result in a maximum air concentration equal to the TAC's Reference Exposure Level (i.e., a hazard index of one).

In recent years, the usage of a number of industrial and commercial solvents has changed due to regulatory controls, and these changes are reflected in the District's emissions inventories. For example, the 2001 emissions of perchloroethylene are 49 percent less than the emissions that were reported five years earlier. These emission reductions are primarily due to the efforts of Bay Area dry cleaners to comply with the District's perchloroethylene dry cleaning rule. Similarly, the emissions of methylene chloride, another heavily regulated solvent, have been reduced by 46 percent over the last five years. Reductions in 1,1,1-trichloroethane (TCA) emissions are even more dramatic over this five-year period, with emissions from permitted sources declining 90 percent. The production of TCA was banned on January 1, 1996, under national stratospheric ozone protection regulations.

AIR TOXICS AMBIENT MONITORING NETWORK

Monitoring is considered the definitive method for establishing ambient pollutant concentrations. One limitation of air monitoring is that it is spatially limited to specific monitoring locations. This problem has been minimized to a great extent in the Bay Area by the operation of an extensive air toxics monitoring network. The locations of the air toxics monitoring sites operating in the Bay Area at the end of 2001 are shown in Figure 1.

The air monitoring network operated by the District includes gaseous samples collected over 24-hour periods on a 12-day sampling frequency. The network began in 1986 with six sites, and has gradually been expanded to its present size of 20 sites. The sampling sites in the network are generally community oriented, and are most directly influenced by areawide sources. The network also includes a non-urban background site located at Fort Cronkhite on the Pacific Ocean coastline. The analytical protocol includes the following 12 gaseous compounds: benzene, carbon tetrachloride, chloroform, ethylene dibromide, ethylene dichloride, methyl tert butyl ether (MTBE), methylene chloride, perchloroethylene, toluene, trichloroethane, trichloroethylene, and vinyl chloride.

The 2001 data for the District's ambient toxics monitoring network are presented in Volume II of this report. The data are sorted both by monitoring station (Appendix C-1) and by pollutant (Appendix C-2). The average 2001 TAC concentrations calculated from all of the measurements in the entire District monitoring network are given in Table 3. The following data were not included in calculating the 2001 average levels: (1) the Fort Cronkhite background site, (2) the Oakland – Filbert Street site which started operation in Sept 2001, and (3) the San Pablo site which started operation in Oct. 2001.

CARB also conducts routine air toxics monitoring at several sites in the Bay Area as a part of their statewide toxics ambient monitoring network. The monitoring conducted by CARB includes several additional gaseous compounds (e.g., formaldehyde and acetaldehyde) as well as some particulate-based TACs (e.g., select toxic metals and several species of polycyclic aromatic hydrocarbons). Toxics sampling was suspended at two of the five CARB ambient monitoring sites in the Bay Area (i.e., the Concord and San Pablo sites) at the end of February 2000. These sites were replaced by sites located at the Lockwood Elementary School in Oakland, and the John Swett High School in Crockett, which are part of the monitoring network required under the Children's Environmental Health Protection Program established under State law (SB-25, Escutia). Monitoring at these school sites began in late 2001 and ended in 2003.

Table 4 shows the lifetime cancer risks associated with exposure to annual average TAC concentrations measured in the Bay Area for the calendar year 2001. Figure 2 depicts these same data in graphic form. The total calculated lifetime cancer risk is 173 in one million. This cancer risk was calculated based on inhalation exposures using the Unit Risk Factors and exposure assumptions adopted by OEHHA for the ATHS Program. All of the carcinogenic TACs measured in the District and CARB monitoring networks in 2001 are included, except for ethylene dibromide, ethylene dichloride, and vinyl chloride, which were excluded because these compounds were not detected in any of the air samples taken. Data

collected at the two SB-25 school sites in late 2001 were also not included in determining the network annual averages. In calculating average concentrations for TACs, samples with concentrations less than the limit of detection (LOD) of the analytical method used were assumed to be equal to one half the LOD concentration. The total cancer risk resulting from exposure to the mixture of various measured TACs was assumed to be additive.

Of the pollutants for which monitoring data are available, 1,3-butadiene and benzene, which are primarily emitted from mobile sources, contribute most significantly to the inhalation cancer risk. These two pollutants together account for 59 percent of the total risk. Other pollutants with contributions to the average inhalation cancer risk of three percent or more are carbon tetrachloride, hexavalent chromium, and formaldehyde.

The average ambient levels of benzene dropped significantly in 1996 due to the widespread use of Phase 2 reformulated gasoline, which began in the Bay Area in the second quarter of 1996. For example, the network average benzene level for 2001 is less than one-half of what was observed in 1995. A number of control measures already adopted by CARB should provide additional, although more gradual, reductions in mobile source related emissions of benzene and 1,3-butadiene in the future. These include the Low-Emission Vehicle/Clean Fuels (LEV) program and requirements for utility engines and off-road vehicles/engines.

Carbon tetrachloride accounts for 16 percent of the 2001 average calculated cancer risk. Carbon tetrachloride exists at background levels in the air of about 0.10 to 0.13 parts per billion nearly uniformly on a global basis. It is believed that the emissions from stationary sources have globally accumulated in the atmosphere due to this compound's very long residence time. The production of carbon tetrachloride in the United States was banned beginning in 1996.

Hexavalent chromium accounts for about 10 percent of the average cancer risk calculated for 2001. The Bay Area network average ambient hexavalent chromium concentration for the year 2001 is 15 percent lower than what was observed five years earlier. The relatively uniform geographic distribution of ambient hexavalent chromium levels suggests that emissions occur primarily on an areawide, rather than a point source, basis.

Formaldehyde accounts for about nine percent of the 2001 average calculated cancer risk for the Bay Area. Formaldehyde is emitted directly from vehicles and other combustion sources, and is also created during photochemical reactions in the atmosphere. The District-wide average formaldehyde level for 2001 is about 23 percent less than what was observed five years earlier.

There is growing evidence that indicates that exposure to emissions from diesel-fueled engines, about 95 percent of which come from diesel-fueled mobile sources, may result in cancer risks that exceed those attributed to other measured TACs. In 1998, OEHHA issued a health risk assessment that included estimates of the cancer potency of diesel particulate matter (PM). Because diesel PM cannot be directly monitored in the ambient air, however,

estimates of cancer risk resulting from diesel PM exposure must be based on concentration estimates made using indirect methods (e.g., derivation from ambient measurements of a surrogate compound). Based on CARB estimates of the population-weighted average ambient diesel PM concentration for the Bay Area, and the best-estimate cancer potency factor adopted by OEHHA, the average cancer risk associated with exposure to diesel PM for 2001 is about 440 in one million.

One group of pollutants that have not been routinely monitored in ambient air are polychlorinated dioxins and furans (generally referred to as "dioxin"). In an effort to improve the understanding of the levels of dioxin in the ambient air in the Bay Area, and their deposition onto land and water surfaces, the District has begun an ambient air dioxin-monitoring program. Monitoring began at the first site in this network when sampling began at Ft. Cronkhite on November 22, 2000. The Ft. Cronkhite site has been established as part of the U.S. EPA's National Dioxin Air Monitoring Network (NDAMN). Six additional dioxin air monitoring sites were also started-up in 2001, with sites in Crockett, Livermore, Oakland, Richmond, San Jose, and San Francisco (the Crockett and Oakland locations were SB-25 monitoring sites that were shutdown in the first half of 2003). Based on preliminary monitoring data, the calculated inhalation cancer risk associated with dioxin exposure in the Bay Area (using the OEHHA cancer potency factor) is less than 2 in one million.

TABLES & FIGURES

{Page Intentionally Left Blank}

Table 1. Bay Area Facilities with Health Risks Requiring Public Notification Under the Air Toxics Hot Spots Program

Facility	City	County	Maximum Cancer Risk (Chances in One million)
Level 3 Risks (Greater than 500 in one million)			
None	n/a	n/a	n/a
Level 2 Risks (Between 100 and 500 in one million)			
None	n/a	n/a	n/a
Level 1 Risks (Between 10 and 100 in one million)			
None	n/a	n/a	n/a

NOTES:

There are currently no facilities requiring public notification under the Air Toxics Hot Spots (ATHS) Program (AB-2588) in the Bay Area. Dry cleaners and gasoline stations are not included on this list because both of these source categories are being considered in an industrywide category under the ATHS Program.

Public notification requirements under the ATHS Program are based on the health risks associated with a facility's routine toxic air contaminant (TAC) emissions as determined in a Health Risk Assessment. The "individual cancer risk" is the likelihood that a person exposed to concentrations of TACs from a facility over a 70-year lifetime will contract cancer, based on the use of standard risk assessment methodology established for the ATHS Program. These cancer risks are based on "best estimates" of plausible cancer potencies, as determined by the Cal/EPA Office of Environmental Health Hazard Assessment. The actual degree of risk cannot be determined, and may approach zero.

Table 2a. MACT Standards Adopted Under Title III of the 1990 Amendments to the Federal Clean Air Act

Source Category	Type of Facility Affected
Acetal Resins Production	Major
Acrylic Fibers/Modacrylic Fibers Production	Major
Acrylonitrile-Budadiene-Styrene Production	Major
Aerospace Industries	Major
Amino Resins Production	Major
Asphalt Processing and Asphalt Roofing Manufacture	Major
Boat Manufacturing	Major
Brick and Structural Clay Products Manufacturing	Major
Carbon Black Production	Major
Cellulose Production Manufacturing	Major
Chromium Electroplating and Anodizing	Area
Clay Ceramics Manufacturing	Major
Clay Products Manufacturing	Major
Coke Oven Batteries (Charging, Top Side, and Door Leaks)	Major
Coke Ovens (Pushing, Quenching, and Battery Stacks)	Major
Commercial Sterilization Facilities	Area
Cyanide Chemicals Manufacturing	Major
Engine Test Cells/Stands	Major
Epichlorohydrin Elastomers Production	Major
Epoxy Resins Production	Major
Ethylene Processes	Major
Ethylene-Propylene Rubber Production	Major
Fabric Printing, Coating, and Dyeing	Major
Ferroalloys Production: Silicomanganese and Ferromanganese	Major
Flexible Polyurethane Foam Production	Major
Friction Products Manufacturing	Major
Gasoline Distribution (Stage I)	Major
Halogenated Solvent Cleaners	Area
(continued)	

Table 2a. MACT Standards Adopted Under Title III of the 1990 Amendments to the Federal Clean Air Act (cont.)

Source Category	Type of Facility Affected
Hydrochloric Acid Production	Major
Hydrogen Fluoride Production	Major
Hypalon™ Production	Major
Industrial Process Cooling Towers	Major
Integrated Iron and Steel Manufacturing	Major
Large Appliance (Surface Coating)	Major
Leather Finishing Operations	Major
Magnetic Tape Manufacturing	Major
Marine Vessel Loading Operations	Major
Metal Coil (Surface Coating)	Major
Metal Furniture (Surface Coating)	Major
Methyl Methacrylate-Butadiene-Styrene Terpolymers Production	Major
Methyl Methacrylate-Acrylonitrile-Butadiene-Styrene Production	Major
Mineral Wool Production	Major
Municipal Solid Waste Landfills	Area
Natural Gas Transmission and Storage	Major
Neoprene Production	Major
Nitrile Budadiene Rubber Production	Major
Non-Nylon Polyamides Production	Major
Nutritional Yeast Manufacturing	Major
Off-Site Waste and Recovery Operations	Major
Oil and Natural Gas Production	Major
Paper and Other Web (Surface Coating)	Major
Perchloroethylene Dry Cleaning	Area
Pesticide Active Ingredient Production	Major
Petroleum Refineries	Major
Petroleum Refineries (3 Vents)	Major
Pharmaceuticals Production	Major
(continued)	

Table 2a. MACT Standards Adopted Under Title III of the 1990 Amendments to the Federal Clean Air Act (cont.)

Source Category	Type of Facility Affected
Phenolic Resins Production	Major
Phosphoric Acid/Phosphate Fertilizer Production	Major
Polybutadiene Rubber Production	Major
Polycarbonates Production	Major
Polyether Polyols Production	Major
Polyethylene Terephthalate Production	Major
Polystyrene Production	Major
Polysulfide Rubber Production	Major
Polyvinyl Chloride and Copolymers Production	Major
Portland Cement Manufacturing	Area
Primary Aluminum Production	Major
Primary Copper Smelting	Major
Primary Lead Smelting	Major
Printing and Publishing	Major
Publicly Owned Treatment Works (POTW)	Major
Pulp and Paper Production	Major
Refractory Products Manufacturing	Major
Reinforced Plastic Composites Production	Major
Secondary Aluminum Production	Area
Secondary Lead Smelting	Area
Semiconductor Manufacturing	Major
Sewage Sludge Incineration	Major
Shipbuilding and Ship Repair (Surface Coating)	Major
Spandex Production	Major
Steel Pickling Facilities and Hydrochloric Acid Regeneration Plants	Major
Styrene-Acrylonitrile Production	Major
Styrene-Butadiene Rubber and Latex Production	Major
Synthetic Organic Chemical Manufacturing	Major
(continued)	

Table 2a. MACT Standards Adopted Under Title III of the 1990 Amendments to the Federal Clean Air Act (cont.)

Source Category	Type of Facility Affected
Tetrahydrobenzaldehyde Production	Major
Tire Manufacturing	Major
Uranium Hexafluoride Production	Major
Vegetable Oil Production Solvent Extraction	Major
Waste Treatment and Disposal: Hazardous Waste Incineration	Area
Wet Formed Fiberglass Mat Production	Major
Wood Building Products (Surface Coating)	Major
Wood Furniture Manufacturing	Major
Wool Fiberglass Manufacturing	Major

NOTES:

Table 2a lists the MACT Standards that have been adopted by the U.S. EPA under Section 112(d) of the 1990 Amendments of the Clean Air Act as of July 23, 2003. "Major" means the MACT Standard applies only to major sources of hazardous air pollutants (HAPs). A major source of HAPs is a facility that emits, or has the potential to emit considering controls, 10 tons per year or more of any individual HAP or 25 tons per year or more of any combination of HAPs. "Area" means the rule applies to both major sources of HAPs and area sources as well (i.e., facilities with HAP emissions below the major source thresholds). Area sources are subject to MACT Standards if the U.S. EPA makes a finding that emissions from affected area sources present a threat of adverse effects to human health or the environment.

Table 2b. 10-Year MACT Standards to be Adopted Under Title III of the 1990 Amendments to the Federal Clean Air Act

Source Category	Type of Facility Affected
Alkyd Resins Production	Major
Ammonium Sulfate Production	Major
Auto and Light Duty Truck (Surface Coating)	Major
Benzyltrimethylammonium Chloride Production	Major
Carbonyl Sulfide Production	Major
Chelating Agents Production	Major
Chlorinated Paraffins Production	Major
Combustion Turbines	Major
Ethylidene Norbornene Production	Major
Explosives Production	Major
Hydrazine Production	Major
Industrial, Institutional and Commercial Boilers and Process Heaters	Major
Iron and Steel Foundries	Major
Lime Manufacturing	Major
Maleic Anhydride Copolymers Production	Major
Manufacture of Paints, Coatings, and Adhesives	Major
Mercury Cell Chlor-Alkali Plants	Major
Metal Can (Surface Coating)	Major
Miscellaneous Metal Parts and Products (Surface Coating)	Major
OBPA/1,3-Diisocyanate Production	Major
Organic Liquids Distribution (Non-Gasoline)	Major
Photographic Chemicals Production	Major
Phthalate Plasticizers Production	Major
Plastic Parts and Products (Surface Coating)	Major
Plywood and Composite Wood Products	Major
Polyester Resins Production	Major
Polymerized Vinylidene Chloride Production	Major
Polymethyl Methacrylate Resins Production	Major
(continued)	

Table 2b. 10-Year MACT Standards to be Adopted Under Title III of the 1990 Amendments to the Federal Clean Air Act (cont.)

Source Category	Type of Facility Affected
Polyvinyl Acetate Emulsions Production	Major
Polyvinyl Alcohol and Polyvinyl Butyral Production	Major
Primary Magnesium Refining	Major
Quaternary Ammonium Compounds Production	Major
Reciprocating Internal Combustion Engines	Major
Rubber Chemicals Production	Major
Site Remediation	Major
Symmetrical Tetrachloropyridine Production	Major
Taconite Iron Ore Processing	Major

NOTES:

Table 2b lists the MACT Standards that were scheduled for adoption by the U.S. EPA under Section 112(d) of the 1990 Amendments of the Clean Air Act by November 15, 2000 (the so-called "10-year standards"), and which have not been adopted as of July 23, 2003. "Major" means the MACT Standard will apply only to major sources of HAPs, unless the U.S. EPA makes a finding that emissions from affected area sources present a threat of adverse effects to human health or the environment.

Table 3. Summary of 2001 BAAQMD Ambient Air Toxics Monitoring Data

Compound	LOD (ppb)	% of Samples < LOD	Maximum Conc. (ppb)	Minimum Conc. (ppb)	Mean Conc. (ppb)
Benzene	0.10	0	2.50	0.10	0.53
Chloroform	0.02	72	0.41	<0.02	0.03
Carbon Tetrachloride	0.01	0	0.20	0.05	0.10
Ethylene Dibromide	0.02	100	<0.02	<0.02	0.01
Ethylene Dichloride	0.10	100	<0.10	<0.10	0.05
Methyl Tert Butyl Ether	0.50	47	7.10	<0.50	0.70
Methylene Chloride	0.50	88	5.20	<0.50	0.32
Perchloroethylene	0.01	7	0.46	<0.01	0.05
Toluene	0.10	0	11.9	0.20	1.28
1,1,1-Trichloroethane	0.05	28	0.83	<0.05	0.11
Trichloroethylene	0.08	96	0.38	<0.08	0.04
Vinyl Chloride	0.30	100	<0.30	<0.30	0.15

NOTES:

Table 3 summarizes the results of the BAAQMD gaseous toxic air contaminant monitoring network for the year 2001. These data represent monitoring results at 17 of the 20 separate sites at which samples were collected. Data from three sites were excluded from the table as follows: the Fort Cronkhite "clean-air" background site; the Oakland – Filbert Street site which started operation in Sept 2001; and the San Pablo Site which started operation in Oct 2001.

(1) "LOD" is the limit of detection of the analytical method used.
(2) "% of samples < LOD" is the percent of the total number of air samples collected in 2001 that had pollutant concentrations less than the LOD.
(3) "Maximum Conc." is the highest daily concentration measured at any of the 17 monitoring sites.
(4) "Minimum Conc." is the lowest daily concentration measured at any of the 17 monitoring sites.
(5) "Mean Conc." is the arithmetic average of the air samples collected in 2001 at the 17 monitoring sites. In calculating the mean, samples with concentrations less than the LOD were assumed to be equal to one half the LOD concentration.

Table 4. Cancer Risk Due to Average Ambient Concentrations of Toxic Air Contaminants Measured in the Bay Area in 2001

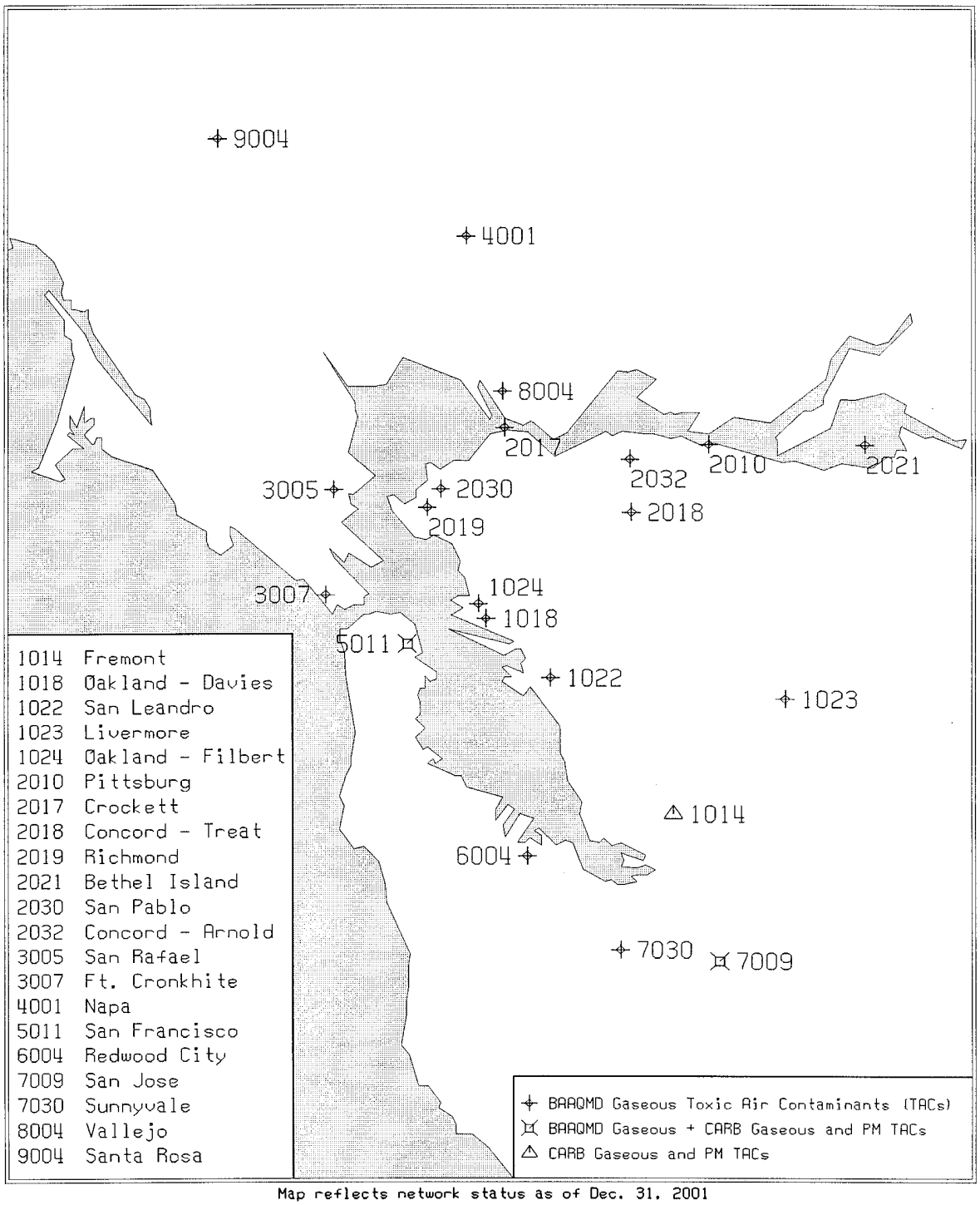
Gaseous TACs	Concentration		Unit Risk	Cancer Risk
	Ppb	μg/m³	(μg/m³)⁻¹	Chances in one million
1,3-Butadiene (2)	0.14	0.31	1.7E-04	52.7
Benzene (1)	0.53	1.73	2.9E-05	50.2
Carbon Tetrachloride (1)	0.10	0.66	4.2E-05	27.7
Formaldehyde (2)	2.04	2.51	6.0E-06	15.1
Acetaldehyde (2)	0.70	1.27	2.7E-06	3.4
Perchloroethylene (1)	0.06	0.41	5.9E-06	2.4
Methylene Chloride (1)	0.32	1.15	1.0E-06	1.2
MTBE (1)	0.70	2.60	2.6E-07	0.7
Chloroform (1)	0.03	0.15	5.3E-06	0.8
Trichloroethylene (2,3)	0.02	0.10	2.0E-06	0.2
Particulate TACs	**ng/m³**	**μg/m³**	**(μg/m³)⁻¹**	**Chances in one million**
Chromium (hexavalent) (2)	0.11	1.11E-04	1.5E-01	16.7
PAHs (2,4)	0.52	5.22E-04	1.1E-03	0.6
Nickel (2)	3.46	3.46E-03	2.6E-04	0.9
Lead (2)	7.28	7.28E-03	1.2E-05	0.1
Total for all TACs				**173**

NOTES:

Table 4 summarizes the cancer risks associated with exposure to average ambient (outdoor) toxic air contaminant (TAC) levels measured at a number of sites in the Bay Area during 2001. Cancer risks are calculated for the inhalation pathway using the Unit Risk Factors adopted by Cal/EPA's Office of Environmental Health Hazard Assessment for the Air Toxics Hot Spots Program, and assuming 70-year continuous exposure. Risks are calculated for the carcinogenic TACs for which routine sampling was performed by the BAAQMD or CARB in 2001, except for ethylene dibromide, ethylene dichloride, and vinyl chloride, which were excluded because none of these were detected in any of the air samples taken. In calculating average concentrations, samples less than the limit of detection (LOD) were assumed to be equal to one half the LOD concentration.

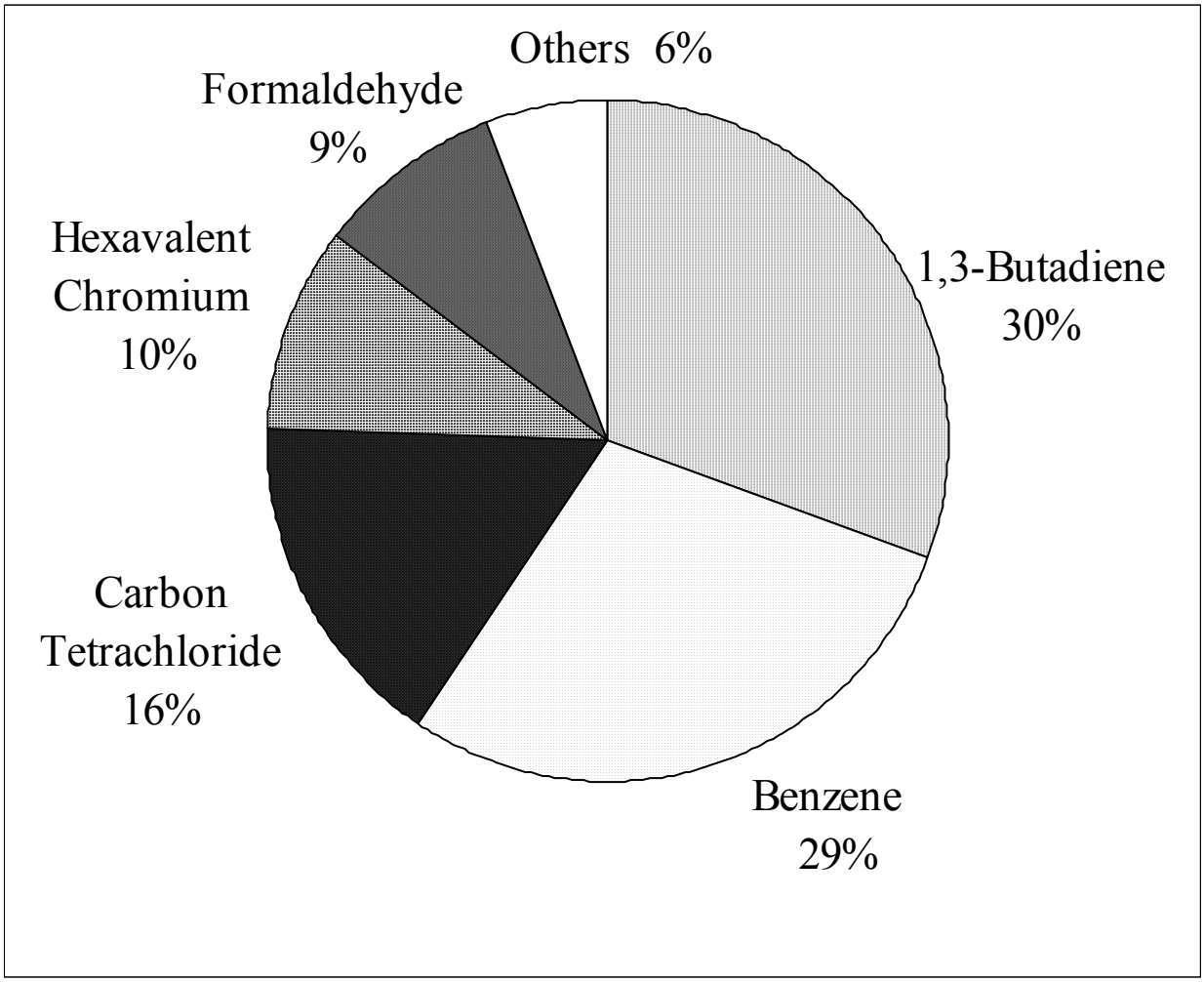
(1) The concentration used is the mean of all daily samples taken for the BAAQMD network in 2001, as specified in Table 3.
(2) The concentration used is the mean of all daily samples taken for the three Bay Area sites in the CARB network in 2001 (Fremont, San Francisco – Arkansas, and San Jose – 4th Street).
(3) CARB data are used for this TAC because an analytical method with a lower LOD was used by CARB.
(4) The PAH concentration represents the sum of the following species collected as PM_{10}: benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

Figure 1.Bay Area Ambient Air Toxics Monitoring Network



Map reflects network status as of Dec. 31, 2001

Figure 2. Pollutant Contribution to Cancer Risk Due to Average Ambient Concentrations of Toxic Air Contaminants Measured in the Bay Area in 2001



NOTES:

This chart summarizes the pollutant contribution to the cancer risk associated with inhalation exposure to average ambient toxic air contaminant levels measured at a number of sites in the Bay Area during 2001, based on data provided in Table 4. Cancer risks are calculated for the inhalation pathway using the Unit Risk Factors established by Cal/EPA's Office of Environmental Health Hazard Assessment for the Air Toxics Hot Spots Program, and assuming 70-year continuous exposure. The total average cancer risk for all of the measured TACs was 173 in one million for the inhalation pathway. "Others" are acetaldehyde, chloroform, methylene chloride, MTBE, lead, nickel, PAHs, perchloroethylene, and trichloroethylene.