CALIFORNIA AIR TOXICS "HOT SPOTS" INFORMATION AND ASSESSMENT ACT (AB2588)

2002 Air Toxics "Hot Spots" Program Report for San Diego County

December 2003

SAN DIEGO COUNTY
AIR POLLUTION CONTROL DISTRICT
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INTRODUCTION

The California Air Toxics "Hot Spots" Information and Assessment Act, Assembly Bill 2588 (AB2588), was enacted by the Legislature in 1987 to address public concern over the release of toxic air contaminants into the atmosphere. The law requires facilities emitting toxic substances to provide local air pollution control districts with information to identify sources of toxic air contaminants, assess air toxic problems, locate resulting "hot spots," notify persons that may be exposed to significant risks, and develop effective strategies to reduce potential risks to the public.

A requirement of the Air Toxics "Hot Spots" Information and Assessment Act (Section 44363 of the Health and Safety Code) is for local air pollution control districts to provide the public with an annual progress report on the program. This report fulfills that requirement by providing information about emission inventories, approved health risk assessments, public notification procedures, and steps undertaken to reduce public health risks. State and local health officials use the report to establish priorities for developing and implementing air toxic control measures to protect public health.

This report summarizes the AB2588 program elements, the current status of the program in San Diego County, stationary and mobile emission estimates, results of local health risk assessments, current status of public notifications, and conclusions drawn from the program to date. Stationary source emission estimates, by facility, are also available on the Air Pollution Control District's (District) website (www.sdapcd.co.san-diego.ca.us) by selecting the Air Toxics button and then selecting Emission Inventory. In addition, stationary source emissions inventories are available upon request for those without Internet access.

Although toxic air contaminant emissions from stationary sources in San Diego County have been reduced by approximately 80% since 1989, large amounts of toxic compounds are still emitted into the air from a wide variety of sources including motor vehicles, industrial facilities, household products, area sources, and natural processes. Prioritizing and reducing these emissions further will require a continued, cooperative effort by the public, industry, environmental groups, Air Resources Board (ARB), and the San Diego County Air Pollution Control District.

BACKGROUND

The San Diego County Air Pollution Control District is the implementing agency for approximately 1,800 San Diego facilities required to comply with the Air Toxics "Hot Spots" Act. The law requires facilities to submit information that is used to achieve the objectives of the program. For larger industrial facilities, this information includes:

- **Emission Inventory Reports** - Facilities must submit the information needed by the District to prepare a toxic emissions inventory report. The District then prioritizes each facility to determine if a health risk assessment is necessary based upon the amount and toxicity of the reported emissions.

- **Health Risk Assessments** - Facilities required to submit health risk assessments must determine the level of public exposure to emitted compounds and potential adverse public health impacts. The State Office of Environmental Health Hazard Assessment (OEHHA) assists the District in reviewing each health risk assessment.

- **Public Notification** - If an adverse health impact exceeding public notification levels (specified in District Rule 1210) is identified, the facility must provide notice to all exposed persons regarding the results of the health risk assessment.

- **Risk Reduction Audits and Plans -** Facilities with emissions that pose a potentially significant public health risk must submit a risk reduction audit and plan to the District. This plan must demonstrate how the facility will reduce health risks below significant levels. The facility must implement the plan as approved by the District.

The Air Toxics "Hot Spots" program has been implemented in phases. Facilities are required to update their toxic inventories at least every four years depending on program status for each facility.

The District has designed the local program to allow many small businesses to meet inventory requirements more cost-effectively by completing industry-specific reporting forms. For larger facilities, the District creates customized inventory forms based upon site-specific equipment information. The District has also standardized and automated many computational and recordkeeping tasks. In collaboration with the ARB, OEHHA, and other air agencies, generic health risk assessments have been developed for gas stations, dry cleaners, and auto body shops to assess industry-wide impacts. These program enhancements save businesses time and money.

The District is required to review and approve the data submitted by facilities, compile an inventory of emissions, and publish periodic reports on the region's toxic air contaminant emissions, risk assessment results, and control measure effectiveness. These reports are used by health officials to develop strategies for protecting the public health.

Toxic air contaminant emissions should not necessarily be equated with a significant health risk (cancer or noncancer) to any individual or the public. The quantity and toxicity of the compounds being emitted and the level of public exposure must be known before drawing conclusions about health risks. This report presents data on emissions from several hundred facilities. In some cases, data on public exposure is still being developed, updated or reviewed. Health risk assessments have been completed for 62 local facilities.

However, exposure to the toxic compounds in question, in sufficient quantities, can cause health problems ranging from relatively mild, temporary conditions such as minor eye or throat irritation, shortness of breath or headaches, to permanent and serious conditions such as cancer, birth defects, or damage to lungs, nerves, the liver, the heart, or other organs.

PROGRAM DESCRIPTION AND STATUS

Implementing the Air Toxics "Hot Spots" Information and Assessment Act consists of several distinct elements: toxic emission inventory reports, facility prioritizations, health risk assessments, public notification, and risk reduction. Program elements are described below.

Toxic Emission Inventory Reports

The first step in implementing the program is the preparation of a toxic emission inventory report for each facility. Facilities are required to complete and submit emission inventory report forms for each process to be inventoried. The District has developed toxic emission inventory reporting procedures that streamline this process while meeting the requirements of the ARB Emissions Inventory Criteria and Guidelines regulation. For example, facilities are no longer required to perform emission calculations. Instead, the District calculates these emissions based on information supplied by the facility. Additionally, the District has merged the Toxic Emission Reports with the Criteria Emission Reports to eliminate duplicate data requests.

Each facility must submit updated toxic emission inventory information to the District at least every four years in accordance with a schedule developed by the District. The District reviews the toxic emission inventory information, identifies deficiencies, requests clarification, calculates facility emissions, and prepares a site-specific toxic emission inventory report. The District also assesses toxic air contaminant emissions from landfills, which have completed the Calderon SWAT testing.

The District has evaluated at least three toxic emission inventories for most facilities in San Diego County. An estimate of current toxic air contaminant emissions from all sources, industrial and non-industrial, is presented in Table 1 of this report.

The industrial source emission estimates provided in Table 1 are from District evaluations of several hundred individual stationary sources, as well as emission surveys of 398 auto body shops, 704 gasoline stations, and 291 dry cleaners. Detailed emission inventories for individual facilities are available on the District's website. Estimates of mobile, area, and natural source emissions prepared by the ARB are also presented in Table 1.

Table 1: Estimated Toxic Air Contaminant Emissions - All Sources

Toxic Air Contaminants	Total Industrial Source Emissions (lbs/year)	Total Mobile, Area, Natural Source Emissions (lbs/year)	Total San Diego County emissions (lbs/year)
Toluene	235,648	5,474,718 (3)	5,710,366
Xylenes	207,744	4,044,958 (3)	4,252,702
Diesel Particulate Matter	see footnote (6)	3,346,000 (4)	3,346,000
Propylene	690	3,045,028 (3)	3,045,718
Formaldehyde	60,716	2,900,000 (4)	2,960,716
Benzene	28,652	2,842,000 (4)	2,870,652
Acetaldehyde	10,254	1,088,000 (4)	1,098,254
Glycol Ethers & Acetates	58,334	1,013,482 (3)	1,071,816
Methylene Chloride	73,261	620,000 (4)	693,261
Perchloroethylene	265,395	364,000 (4)	629,395
Methyl Tert Butyl Ether (1)	558,242	no data available	558,242
1,3-Butadiene	951	527,000 (4)	527,951
Ammonia	30,579	425,286 (3)	455,865
Zinc (2)	3,653	447,532 (3)	451,185
Phosphorous (2)	12	426,033 (3)	426,045
Dichlorobenzene	388	300,000 (4)	300,388
Isopropyl Alcohol (1)	283,664	no data available	283,664
Silica, Crystalline (2)	267,792	no data available	267,792
Styrene	93,374	157,585 (5)	250,959
Methanol	24,813	219,297 (3)	244,110
Hexane	195,514	no data available	195,514
Methyl Ethyl Ketone	188,415	no data available	188,415
Butanol	177,844	no data available	177,844
Acrolein	912	145,633 (5)	146,545
Hydrochlorofluorocarbons (1)	101,474	no data available	101,474
Copper (2)	4,349	87,713 (3)	92,062
Polycyclic Aromatic Hydrocarbons (PAH), Unspecified (2)	625	79,580 (3)	80,205
Methyl Isobutyl Ketone	73,251	no data available	73,251
Ethyl Benzene	60,277	no data available	60,277
Naphthalene (2)	1,327	58,780 (3)	60,107
Hydrogen Chloride	52,845	no data available	52,845
2,2,4-Trimethylpentane	33,790	no data available	33,790
1,2,4-Trimethylbenzene	27,232	no data available	27,232
Aluminum (2)	21,898	no data available	21,898
Hydrogen Sulfide	14,463	no data available	14,463
Chlorobenzene	215	7,753 (3)	7,968
Phenol	7,365	no data available	7,365
Propylene Oxide	6,455	no data available	6,455
Ethylene Glycol	5,470	no data available	5,470
Trichloroethylene	5,040	no data available	5,040

Table 1: Estimated Toxic Air Contaminant Emissions - All Sources (continued)

Toxic Air Contaminants	Total Industrial Source Emissions (lbs/year)	Total Mobile, Area, Natural Source Emissions (lbs/year)	Total San Diego County emissions (lbs/year)
Dimethyl Sulfide	3,678	no data available	3,678
Manganese [2]	1,853	1,691 [5]	3,544
Vinyl Chloride	3,496	no data available	3,496
1,1,1-Trichloroethane	3,377	no data available	3,377
Methyl Methacrylate	3,107	no data available	3,107
Chlorofluorocarbons	2,962	no data available	2,962
Acrylonitrile	2,540	no data available	2,540
Ethylene Dichloride	2,528	no data available	2,528
Dioxane,1,4-	2,216	no data available	2,216
Hydrogen Fluoride	2,003	no data available	2,003
Nitric Acid	1,748	no data available	1,748
Barium [2]	1,740	no data available	1,740
Sodium Hydroxide	1,570	no data available	1,570
Lead [2]	255	1,301 [5]	1,556
Methylene Diphenyl Diisocyanate [1]	1,158	no data available	1,158
Nickel [2]	875	279 [5]	1,154
Chloroform	1,096	no data available	1,096
Arsenic [2]	249	814 [5]	1,063
Selenium [2]	247	717 [3]	964
Sulfuric Acid	881	no data available	881
Carbon Disulfide	803	no data available	803
Chlorine	682	no data available	682
Dibutyl Phthalate [1]	477	no data available	477
Quinone	477	no data available	477
Chromium, Hexavalent [2]	32	360 [4]	392
Vinyl Acetate	308	no data available	308
Carbon Tetrachloride	234	no data available	234
Carbonyl Sulfide	222	no data available	222
Cadmium [2]	64	83 [5]	147
Vinylidene Chloride	141	no data available	141
Mercury [2]	98	5 [5]	103
Thallium [2]	66	no data available	66
Silver [2]	39	no data available	39
Cobalt [2]	34	no data available	34
Benzyl Chloride	14	no data available	14

Table 1: Estimated Toxic Air Contaminant Emissions - All Sources (continued)

Toxic Air Contaminants	Total Industrial Source Emissions (lbs/year)	Total Mobile, Area, Natural Source Emissions (lbs/year)	Total San Diego County emissions (lbs/year)
Crotonaldehyde	11	no data available	11
Isocyanates	6	no data available	6
Beryllium	4	no data available	4
Cyanide [(1)]	4	no data available	4
Totals	3,224,236	27,625,628	30,849,864

1 This compound was added to the Hot Spots list after initial emission estimates were made.
2 This compound is emitted as a particulate.
3 Emission data obtained from ARB's 1990 Report.
4 Emission data obtained from ARB's 2002 Almanac, Table 5-55, Emissions Inventory 2001.
5 Emission data obtained from ARB's 1996 California Toxics Inventory revised August 28, 2000.
6 Diesel Particulate Matter from Total Industrial Sources are accounted as individual toxins (i.e., arsenic, cadmium, copper, hexavalent chromium, lead, nickel, selenium, and zinc).

A comparison of baseline (1989-1991) emission estimates to current (1997-2001) estimates is presented in Table 2. Overall local emissions of toxic air contaminants from industrial sources have decreased by approximately 80% since 1989. The most significant reductions include a variety of chlorinated solvents and heavy metals. Emission increases are primarily the result of increased usage of nonchlorinated replacement solvents. Emission estimates for some compounds have increased although the actual emission levels may not have changed. This is due to changes to combustion-related emission factors and newly listed toxic air contaminants not included in initial inventories. Detailed site-specific emission results are provided on the District's website.

Many improved emission speciation profiles, calculation methodologies, and emission factors have been used to estimate the toxic air contaminants released since the baseline inventory. More accurate facility recordkeeping and material usage reporting have also refined site-specific emission estimates. In some cases, estimated emissions have significantly decreased from amounts reported in the baseline inventory. In other instances, additional compounds have been identified and emissions of some toxic air contaminants have increased.

Table 2: Comparison of Historical and Current Toxic Air Contaminant Emissions -Industrial Sources

Toxic Air Contaminants	Current Industrial Source Emissions (lbs/year)	Historical Industrial Source Emissions (lbs/year) Baseline (1989-1991)	Difference (lbs/year) Baseline to Current
Cyanide*	4	nk	nk
Methylene Diphenyl Diisocyanate*	1,158	nk	nk
Dibutyl Phthalate*	477	nk	nk
Hydrochlorofluorocarbons*	101,474	nk	nk
Methyl Tert Butyl Ether*	558,242	nk	nk
1,1,1-Trichloroethane	3,377	2,727,662	-2,724,285
Chlorofluorocarbons	2,962	1,967,653	-1,964,691
Isopropyl Alcohol	283,664	1,995,151	-1,711,487
Methylene Chloride	73,261	1,318,102	-1,244,841
Perchloroethylene	265,395	1,188,914	-923,519
Propylene Oxide	6,455	587,686	-581,231
Silica, Crystalline	267,792	668,957	-401,165
Styrene	93,374	299,252	-205,878
Methanol	24,813	203,359	-178,546
Sodium Hydroxide	1,570	145,152	-143,582
Glycol Ethers & Acetates	58,334	126,333	-67,999
Dioxane,1,4-	2,216	62,774	-60,558
Xylenes	207,744	243,196	-35,452
Hydrogen Sulfide	14,463	46,391	-31,928
Toluene	235,648	266,164	-30,516
Trichloroethylene	5,040	29,175	-24,135
Ammonia	30,579	49,492	-18,913
Propylene	690	14,860	-14,170
Zinc	3,653	17,517	-13,864
Methyl Methacrylate	3,107	10,882	-7,775
Ethylene Oxide	17	7,612	-7,595
Nickel	875	6,647	-5,772
Phenol	7,365	11,873	-4,508
Carbon Tetrachloride	234	4,655	-4,421
Lead	255	4,076	-3,821
Sulfuric Acid	881	3,600	-2,719
Manganese	1,853	4,546	-2,693
Arsenic	249	2,198	-1,949
Vinyl Chloride	3,496	5,434	-1,938
Copper	4,349	6,230	-1,881
Selenium	247	1,582	-1,335
Mercury	98	1,187	-1,089
Hydrogen Fluoride	2,003	3,078	-1,075
Chloroform	1,096	1,958	-862
Isocyanates	6	355	-349
Naphthalene	1,327	1,615	-288
1,3-Butadiene	951	1,206	-255
Chromium, Hexavalent	32	245	-213
Cadmium	64	226	-162
Beryllium	4	118	-114
Phosphorous	12	30	-18
Crotonaldehyde	11	0	11
Benzyl Chloride	14	0	14
Cobalt	34	0	34

Table 2: Comparison of Historical and Current Toxic Air Contaminant Emissions Industrial Sources (continued)

Toxic Air Contaminants	Current Industrial Source Emissions (lbs/year)	Historical Industrial Source Emissions (lbs/year) Baseline (1989-1991)	Difference (lbs/year) Baseline to Current
Silver	39	0	39
Chlorobenzene	215	170	45
Thallium	66	0	66
Vinylidene Chloride	141	0	141
Carbonyl Sulfide	222	0	222
Vinyl Acetate	308	0	308
Dichlorobenzene	388	0	388
PAH, Unspecified	625	165	460
Quinone	477	0	477
Chlorine	682	0	682
Barium	1,740	1,000	740
Carbon Disulfide	803	0	803
Acrolein	912	0	912
Ethylene Dichloride	2,528	1,536	992
Nitric Acid	1,748	0	1,748
Benzene	28,652	26,805	1,847
Acrylonitrile	2,540	0	2,540
Dimethyl Sulfide	3,678	0	3,678
Ethylene Glycol	5,470	0	5,470
Aluminum	21,898	16,000	5,898
Acetaldehyde	10,254	28	10,226
Hexane	195,514	181,000	14,514
2,2,4-Trimethylpentane	33,790	8,067	25,723
1,2,4-Trimethylbenzene	27,232	0	27,232
Methyl Isobutyl Ketone	73,251	42,000	31,251
Hydrogen Chloride	52,845	21,443	31,402
Formaldehyde	60,716	26,408	34,308
Ethyl Benzene	60,277	16,000	44,277
Butanol	177,844	116,000	61,844
Methyl Ethyl Ketone	188,415	119,000	69,415
Totals	3,224,240	12,612,765	-10,049,881

* This compound was added to the Hot Spots list after initial emission estimates were made.
nk = not known.

In 1990, ARB prepared a toxic emissions inventory report for non-industrial sources (mobile, area, and natural sources) in San Diego County. Total non-industrial source emissions are presented in Table 1. Emissions for the mobile, area, and natural source subcategories are provided in Table 3. Mobile sources include on-road vehicles, off-road vehicles, trains, mobile equipment, and utility equipment. Area sources include residential and commercial non-point sources such as fuel combustion, entrained road dust, waste burning, solvent use, pesticide application, and construction and demolition. Natural sources include wildfires and windblown dust from agricultural operations and unpaved areas. The complete document has been presented in previous District annual reports on the Air Toxics "Hot Spots" program and, therefore, has not been included in this report. Copies of the 1990 ARB report are available from ARB or the District upon request.

More recent emissions data for some mobile, area, and natural source contaminants has been obtained from ARB. In general, the most recent data available for each toxin was included in this report. ARB's 2002 Almanac, Table 5-55, Emissions Inventory 2001 may be found at http://www.arb.ca.gov/aqd/almanac/almanac02/chap502.htm. ARB's 1996 California Toxics Inventory revised August 28, 2000, may be found at http://www.arb.ca.gov/toxics/cti/cti1996082800.pdf. Currently, ARB does not have complete information for all toxins for a given year. The District intends to incorporate more recent area, mobile, and natural emission data when it is generated by ARB.

Table 3: ARB Estimated Toxic Air Contaminant Emissions - Non-Industrial Sources

Toxic Air Contaminants	Mobile Source Emissions (lbs/year)	Area Source Emissions (lbs/year)	Natural Source Emissions (lbs/year)	Total Non-Industrial Source Emissions (lbs/year)
Toluene [1]	4,954,347	520,371	0	5,474,718
Xylenes [1]	3,415,658	629,300	0	4,044,958
Diesel Particulate Matter [2]	3,346,000	0	0	3,346,000
Propylene [1]	2,361,534	89,261	594,233	3,045,028
Formaldehyde [2]	2,656,000	242,000	0	2,898,000
Benzene [2]	2,776,000	66,000	0	2,842,000
Acetaldehyde [2]	876,000	212,000	0	1,088,000
Glycol Ethers & Acetates [1]	0	1,013,482	0	1,013,482
Methylene Chloride [2]	0	620,000	0	620,000
1,3-Butadiene [2]	502,000	8,000	16,000	526,000
Zinc [1]	174,533	271,226	1,773	447,532
Phosphorous [1]	729	422,185	3,119	426,033
Ammonia [1]	19,692	35,914	369,680	425,286
Perchloroethylene [2]	0	364,000	0	364,000
Para-Dichlorobenzene [2]	0	300,000	0	300,000
Methanol [1]	0	219,297	0	219,297
Styrene [3]	150,930	6,650	0	157,580
Acrolein [3]	136,420	9,220	0	145,640
Copper [1]	542	86,739	432	87,713
PAH, Unspecified [1]	0	79,580	0	79,580
Naphthalene [1]	4,858	53,922	0	58,780
Chlorobenzene [1]	5,511	2,242	0	7,753
Manganese [3]	190	370	1,130	1,690
Lead [3]	380	190	720	1,290
Arsenic [3]	360	60	380	800
Selenium [1]	24	611	82	717
Chromium Hexavalent [2]	360	< 20	< 20	400
Nickel [3]	230	50	< 1	281
Cadmium [3]	40	40	1	81
Mercury [3]	0	5	< 1	6
Totals:	21,382,338	5,252,725	987,561	27,622,624

(1) Emission data obtained from ARB's 1990 Report.

(2) Emission data obtained from ARB's 2002 Almanac, Table 5-55, Emissions Inventory 2001.

(3) Emission data obtained from ARB's 1996 California Toxics Inventory revised August 28, 2000.

Facility Prioritization

The purpose of facility prioritization is to identify facilities which emit toxic air contaminants in amounts that warrant a detailed evaluation of potential public health risks through preparation of a site-specific health risk assessment. Prioritization procedures consider the magnitude of toxic air contaminant emissions from facilities and the toxicity of those emissions, but do not consider the dilution characteristics of a specific facility's exhaust stacks or the expected health risks posed by the emissions. Requiring a facility to prepare a risk assessment does not mean the facility poses a significant risk to public health.

The District's first prioritization procedures were prepared in 1990 and were based upon the Air Toxics "Hot Spots" Program Facility Prioritization Guidelines (July 1990) prepared by a committee of the California Air Pollution Control Officers Association (CAPCOA). In 1992, the District revised the procedures by increasing the carcinogenic score that would require a health risk assessment from 10 to 100. The prioritization procedures were revised again in 1996 to incorporate a receptor proximity adjustment factor. The receptor proximity adjustment factor decreases prioritization scores (and potentially priority) for facilities that do not have nearby receptors within 50 meters.

Using the District's prioritization procedures, facilities are placed into three categories: Category A for facilities that either volunteered or are required to prepare and submit a health risk assessment; Category B for facilities that may be required to conduct a health risk assessment at a future date; and Category C for facilities not likely to be required to perform health risk assessments. All facilities are reprioritized based on their most recent approved toxic emissions inventory report. Prioritization procedures can be found on the District's website under Air Toxics.

Health Risk Assessments

A health risk assessment (HRA) is a study of the possible public health risks that may be posed by emissions of toxic compounds. Each facility that has been placed in Category A must prepare and submit a health risk assessment to the District.

The assessment incorporates conservative pollutant dispersion estimates, human exposure assumptions, and health effects information to ensure that the final risk assessments are not underestimated. Accordingly, the results of a risk assessment may overstate actual health risks but are useful in comparing the relative risks of sources and pollutants and setting priorities for mitigation. For example, a risk assessment typically will estimate the increased cancer risk for a hypothetical individual who would remain at the one location with the greatest potential for exposure to toxic air contaminant emissions from the facility for 24 hours a day, 365 days per year, over 70 years.

While the health risk assessment procedures are generally considered to be conservative, some factors that may tend to underestimate impacts are difficult to evaluate. For example, the HRA is based on emission estimates for the indicated inventory year. These emissions are assumed to occur for 70 years to obtain a "lifetime" cancer risk. Years other than the inventory year, in particular for years before this program, may have higher (or lower) emissions. Additionally, the cumulative effect of emissions from other nearby mobile, area, and stationary sources and the potential for complex mixtures of toxic air contaminants to create an additional health problem

by their combined reaction to each other cannot be estimated. Also, some facility emission estimates are based on average factors for individual types of equipment and actual emissions may be higher or lower. Finally, the health risk assessment results only include potential impacts from compounds with OEHHA-approved health values. Compounds without OEHHA-approved health values are not included.

ARB lists more than 700 compounds to be assessed under the Air Toxics "Hot Spots" program. The list includes potentially carcinogenic substances as well as compounds that may cause health problems such as respiratory irritation or central nervous system depression. The toxicity of the listed compounds varies from those that pose concern if more than a few grams are emitted per day, to those that may pose no significant health risks if many pounds are emitted per day. OEHHA reviews and updates the toxicity of the listed compounds. This updated information is then distributed to all groups involved in the program for use in identifying facilities required to prepare risk assessments and in preparing the assessments.

Each health risk assessment is reviewed by the District and OEHHA to identify deficiencies requiring correction. The District then approves, modifies, or returns the health risk assessment for corrections. The results of all risk assessments prepared under this program are available for public review.

Health risk assessments have been conducted for 63 facilities in San Diego County since 1991 (54 large Phase I, 4 intermediate Phase II, and 5 smaller Phase III sites). Twenty-six (26) of the Phase I facilities updated their 1989 evaluations for 1993 to quantify the effects of added control equipment, process material changes, modified manufacturing operations, refined emission estimation techniques, improved emission factors, and revised toxic potencies. In accordance with District Rule 1210, these updated Phase I health risk assessments were used to determine site-specific public notification and risk reduction requirements.

Nine (9) intermediate (Phase II) and small (Phase III) facilities were required to prepare health risk assessments based upon their approved 1994 and 1995 emission inventories. Eight of these health risk assessments are complete and have been reviewed by OEHHA and approved by the District. The most current health risk assessment results for each of the 63 facilities are summarized in Table 4.

The District provides facilities required to conduct a health risk assessment with a protocol and guidelines on how the health risk assessment should be done. New guidelines developed by OEHHA and ARB entitled *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* (Volume 5) and *Interim Risk Management Policy for Inhalation-Based Cancer Risk* are approved. These new guidelines will provide the basis for the next health risk assessments and updates prepared under this program.

The District is currently prioritizing facilities based on the most recent approved toxic emissions inventories to determine where new health risk assessments are required. Approximately 26 new or updated health risk assessments are expected to be required after ARB and OEHHA complete the risk assessment guideline procedures.

The District may also perform screening or generic health risk assessments for small businesses (such as industry-wide survey sources) that are not required to submit full plans and reports. The

District is currently participating in a statewide committee to develop procedures to conduct these industry-wide health risk assessments. The committee is comprised of representatives from local air pollution control districts, ARB, and OEHHA.

Table 4: Health Risk Assessment (HRA) Results

HRA Evaluation Period	Facility		Max. Lifetime Cancer Risk per million (2)	Lifetime Cancer Burden (3)	Chronic THI (4)	Acute THI (5)
1989	General Dynamics / Pacific Hwy (7)	San Diego	1,000	37	3.8	1.0
1995	Palomar Plating (9)	Escondido	364	< 0.1	1.2	N/a
1995	Campbell Marine (7)	San Diego	154	< 0.1	0.83	17
1994	Hues Metal Finishing (9)	San Marcos	85	< 0.1	0.66	12
1989	Otay Landfill (6)	San Diego	42	0.16	< 0.1	< 0.1
1995	Escon Tool and Manufacturing	San Marcos	41	0.25	0.80	3.1
1995	Flame Spray Inc. (9)	San Diego	40	< 0.1	0.14	30
1989	Powerine Oil Co. (7)	San Diego	32	< 0.1	0.10	0
1993	USN Point Loma Naval Complex (1)	San Diego	28	< 0.1	0.18	0.47
1993	National Steel & Shipbuilding (1)	San Diego	27	< 0.1	0.3	3.5
1993	Chem-tronics, Inc. (1, 9)	El Cajon	26	0.12	0.36	20
1993	USMC Miramar / USN Miramar (1)	San Diego	24	0.2	0.13	0.81
1989	Sycamore Landfill (6)	San Diego	19	< 0.1	< 0.1	< 0.1
1993/1998	USN Air Station/North Island (1, 9, 10)	Coronado	15	<0.1	0.20	0.8
1993	USN Navy Station, 32nd St. (1)	San Diego	15	0.2	0.11	3
1993	Santa Fe Pacific Pipeline (1)	San Diego	8	< 0.1	< 0.1	< 0.1
1994	Continental Maritime	San Diego	7.7	< 0.1	< 0.1	0.44
1993	BF Goodrich / Rohr Industries (1)	Chula Vista	7.7	< 0.1	< 0.1	< 0.1
1993	Southwest Marine (1)	San Diego	7.7	< 0.1	< 0.1	2.1
1989	San Marcos Landfill	San Marcos	7.4	< 0.1	< 0.1	< 0.1
1993	Solar Turbines / Ruffin Rd (1)	San Diego	7.3	< 0.1	< 0.1	2.1
1989	S.D. City Pt. Loma Waste Water Treatment. Plant	San Diego	7.3	< 0.1	0.30	1.1
1989	General Dynamics / Kearny Villa Rd (7)	San Diego	6.5	0.53	0.05	0.3
1993	Solar Turbines / Pacific Hwy (1)	San Diego	6.1	< 0.1	< 0.1	3.3
1989	Kelco/Div. Merck & Co. Inc.	San Diego	6.0	0.10	0.40	0.2
1993	Superior Ready Mix / Canyon Rock (1)	San Diego	5.6	< 0.1	< 0.1	0.47
1993	USN Amphibious Base (1, 9)	Coronado	5.3	< 0.1	< 0.1	1.3
1993	Signet Armorlite (1, 9)	San Marcos	4.6	< 0.1	< 0.1	0.47
1994	Senior Flexonics, Ketema Division (9)	El Cajon	4.5	< 0.1	0.02	4.24
1989	Sony	San Diego	4.5	< 0.1	0.09	0.1
1993	Hanson Aggregates/Nelson & Sloan/7th & Main (1)	Chula Vista	4.2	< 0.1	< 0.1	< 0.1
1989	Vulcan / CALMAT Co. / Hwy 76	Pala	4.2	< 0.1	0.10	< 0.1
1989	ARCO	San Diego	4.0	< 0.1	< 0.1	0
1993	Hanson Aggregates / Sim J. Harris (1)	San Diego	3.9	< 0.1	< 0.1	< 0.1
1989	Palomar Airport Landfill	Carlsbad	3.9	< 0.1	< 0.1	< 0.1
1993	Hanson Aggregates/H.G. Fenton/East County Mtls (1)	El Cajon	3.7	< 0.1	< 0.1	0.1
1989	Bonsall Landfill	Vista	3.7	< 0.1	< 0.1	< 0.1
1993	Wyroc (1)	Vista	3.6	< 0.1	< 0.1	0.13
1989	Equillon Enterprises / Shell Oil Co / Mission Rd	San Diego	3.3	< 0.1	< 0.1	0
1989	Vulcan / CALMAT Co. / Friars Rd	San Diego	3.3	< 0.1	0.14	0.3
1993	Hanson Aggregates / Nelson & Sloan / Tri Way (1)	Lakeside	3.1	< 0.1	< 0.1	0.1
1989	Knight & Carver Inc. / Hancock St (7)	San Diego	2.8	< 0.1	< 0.1	0.5
1993	Hanson Aggregates / H.G. Fenton / Carrol Cyn. (1)	San Diego	2.6	< 0.1	< 0.1	< 0.1
1989	Southern California Edison Co.	San Onofre	2.2	< 0.1	< 0.1	< 0.1
1993	Hanson Aggregates/Nelson & Sloan/Birch Quarry (1)	Chula Vista	2.1	< 0.1	< 0.1	0.1
1989	Duke Energy / SDG&E / South Bay Plant	Chula Vista	2.1	< 0.1	< 0.1	0.34
1993	Frazee Paint (1)	San Diego	1.8	< 0.1	0.5	0.5
1989	UCSD Campus	San Diego	1.8	< 0.1	< 0.1	0.4
1989	USMC Base/Camp Pendleton	Pendleton	1.7	< 0.1	0.14	0.64

Table 4: Health Risk Assessment (HRA) Results - continued

HRA Evaluation Period	Facility		Max. Lifetime Cancer Risk per million (2)	Lifetime Cancer Burden (3)	Chronic THI (4)	Acute THI (5)
1993	Asphalt Inc. (1)	Lakeside	1.3	< 0.1	< 0.1	< 0.1
1989	Vulcan / CALMAT Co. / Black Mountain Rd	San Diego	1.3	< 0.1	0.20	0.4
1994	Ogden Power Pacific	Chula Vista	1.0	< 0.1	0.92	0.21
1989	Cabrillo Power / SDG&E / Encina Plant	Carlsbad	0.9	< 0.1	< 0.1	0.1
1989	Cabrillo Power / SDG&E / 32nd St. Naval Station	San Diego	0.8	< 0.1	< 0.1	< 0.1
1989	Texaco Refining & Marketing, Inc.	San Diego	0.8	< 0.1	< 0.1	0
1993	Teledyne Ryan Aeronautical (1, 7)	San Diego	0.79	< 0.1	< 0.1	0.12
1993	Hanson Aggregates / South Coast Materials (1)	Carlsbad	0.7	< 0.1	< 0.1	< 0.1
1989	Chevron USA Inc.	San Diego	0.60	< 0.1	< 0.1	0
1993	Deutsch Co. (1)	Oceanside	0.4	< 0.1	< 0.1	< 0.1
1989	Cabrillo Power / SDG&E / Naval Training Center	San Diego	0.2	< 0.1	< 0.1	< 0.1
1989	San Diego State University	San Diego	0.1	< 0.1	< 0.1	0.5
1989	Cabrillo Power/SDG&E Company/USN North Island	Coronado	0.05	< 0.1	< 0.1	< 0.1
1995	Chromalloy San Diego (8)	El Cajon	*	*	*	*

* Under review

(1) Indicates this facility updated a 1989 health risk assessment in accordance with District Rule 1210.

(2) This column reports the maximum lifetime excess cancer risk estimate reported by the facility or corrected by the District. The maximum estimated risk generally is possible at only one location. All other locations show lower risks. Moreover, this estimate assumes that a person resides at the location of maximum impact 24 hours per day, 365 days per year, for 70 years of exposure. Actual cancer risks will likely be less.

(3) Excess cancer burden is an estimate of the increased number of cancer cases in a population (i.e., all census tracts within or partially within the one in one million isopleth) as a result of exposure to emitted substances.

(4) Chronic total health hazard index (THI) is the sum of the ratios of the average annual exposure level of each compound to the compound's reference exposure level (REL).

(5) Acute total health hazard index (THI) is the sum of the ratios of the maximum 1-hr exposure level of each compound to the compound's reference exposure level (REL).

(6) Cancer risk was < 10 in one million at all residential, occupational, and commercial locations.

(7) This facility has ceased operations.

(8) This facility's HRA has been revised and is under District and OEHHA review.

(9) This facility successfully implemented a risk reduction program (see Table 6).

(10) The cancer and chronic HRA results are based on 1993 HRA. The acute result is based on an updated 1998 acute HRA.

Public Notification and Risk Reduction

The Air Toxics "Hot Spots" program requires significant risk facilities to prepare and implement a plan to reduce risk to below significant risk levels. Facilities found to pose a significant public health risk are required to conduct an airborne risk reduction audit and develop a plan to implement risk reduction measures within six months of the District's determination of significant risk. ARB and CAPCOA collaborated in developing Implementation Guidelines for SB1731, which were released in July 1993. The District's risk reduction requirements are generally consistent with these guidelines.

Once a risk assessment has been reviewed and approved, the District must determine whether the facility poses a significant risk to public health. Any facility that, in the District's judgment, poses a significant health risk, must notify the affected public of that risk. The California Health and Safety Code does not define "significant health risk." The District, in consultation with interested parties, established public notification and significant risk levels (as well as notification procedures) in District Rule 1210. These levels are presented in Table 5.

Table 5: Public Notification and Risk Mitigation Levels

	Public Notification Level	Significant Risk Level
Maximum Incremental Cancer Risk	10	100
Cancer Burden	1.0	1.0
Total Acute Noncancer Health Hazard Index	1.0*	1.0*
Total Chronic Noncancer Health Hazard Index	1.0*	1.0*

* A value greater than 1.0 but less than 5.0 would not trigger public notification or risk reduction requirements if the Air Pollution Control Officer determines, after consultation with OEHHA, that adverse public health effects are unlikely to occur at the levels of exposure estimated in the approved public health risk assessment.

In establishing public notification procedures, the District considered input from CAPCOA Air Toxic "Hot Spots" Program Public Notification Guidelines (October 1992), ARB guidance, other regulatory precedents, public workshops, and a local public notification committee consisting of representatives from the District, local industry and industry groups, academic institutions, and environmental organizations. The procedures are generally consistent with procedures adopted by other California air districts[1]. The status of each facility subject to the public notification and risk reduction requirements of District Rule 1210 is summarized in Table 6.

Facilities required to perform public notification must distribute notices to each household and business that may be exposed to potential risks exceeding the District's public notification level. Notifications must be issued biennially until the facility demonstrates to the District that it has reduced the potential health risk below the notification thresholds.

Of the first group of 54 facilities required to perform HRAs, eight facilities with estimated risks above public notification levels were required to inform the public of their health risk assessment results. These facilities are noted in Table 6. Based on the response from the public, three facilities were required to hold public meetings to provide further information regarding their emissions and their health risk assessment results.

[1] The South Coast Air Quality Management District has revised its cancer risk mitigation threshold to 25 in one million.

Of the nine intermediate (Phase II) and small (Phase III) facilities that were required to conduct HRAs, six had risks above public notification levels and have performed public notification. Three facilities (Flame Spray Inc., Palomar Plating, and Senior Flexonics, Ketema Division) have conducted public meetings based on public response to the notification.

Public notification is required biennially based on the most recent approved health risk assessment until it is demonstrated to the Air Pollution Control Officer that potential health risks have been reduced below public notification levels. NASSCO, USN North Island, Point Loma Naval Center, USN/USMC Miramar, and 32nd St. NAVSTA were required to repeat the biennial public notifications.

Under Rule 1210, facilities with potentially significant public health risks must reduce these risks below significant risk levels within five years. The District may shorten this period if it is technically feasible and economically practicable to implement the plan more quickly, or if the emissions from the facility pose an unreasonable health risk. The District may lengthen the period by up to five additional years if it finds that this will not result in an unreasonable health risk and requiring implementation of the plan within a shorter period places an unreasonable economic burden on the facility or is not technically feasible. Of the facilities that have carried out public notification, six had estimated risks above the significant risk mitigation levels. These facilities are shown in Table 6 and have prepared risk reduction plans. These plans have been approved by the District and are being or have been implemented by the facilities.

Table 6: Public Notification and Risk Reduction Status

HRA Evaluation Period	Facilities Required to Perform Public Notification	
1995	Escon Tool and Mfg., Inc. – San Marcos	This facility performed a Public Notification in 2001 and discontinued use of coatings containing heavy metals. Additional biennial public notifications are not required.
1993	USN Point Loma Naval Complex – San Diego	This facility performed a Public Notification in 1997, 1999, and 2002. Biennial public notifications are required.
1993	National Steel & Shipbuilding – San Diego	This facility performed a Public Notification in 1997, 1999, and 2002. Biennial public notifications are required.
1993	USMC Miramar / USN Miramar – San Diego	This facility performed a Public Notification in 1997, 1999, and 2002. Biennial public notifications are required.
1993	USN Navy Station, 32nd St. – San Diego	This facility performed a Public Notification in 1997, 1999, and 2001. Biennial public notifications are required.
1993	Santa Fe Pacific Pipeline – San Diego	This facility performed a Public Notification on 5/14/97 based on 1989 HRA results. This facility also held a Public Meeting. Risks have since been demonstrated to be below public notification levels.
HRA Evaluation Period	Facilities Required to Perform Both Public Notification and Risk Reduction	
1995	Palomar Plating – Escondido	This facility performed a Public Notification in 2001, held a public meeting and successfully implemented a risk reduction program. Public notifications are no longer required.
1995	Campbell Marine – San Diego	This facility performed a Public Notification in 2001 and has since discontinued operations. Public notifications are no longer required.
1994	Hues Metal Finishing – San Marcos	This facility performed a Public Notification in 2000 and successfully implemented a risk reduction program. Additional biennial public notifications are not required.
1995	Flame Spray Inc. – San Diego	This facility performed a Public Notification in 2000, held a Public Meeting and successfully implemented a risk reduction program. Public notifications are no longer required.
1993/ 1998	USN Air Station/North Island – Coronado	This facility performed a Public Notification in 1997, 2001, and 2003, held a Public Meeting and successfully implemented reduction of acute health risk. Biennial public notifications of potential cancer risk are required.
1993	Chem-tronics, Inc. – El Cajon	This facility performed a Public Notification in 1997, held a Public Meeting and successfully implemented a risk reduction program. Public notifications are no longer required.
1993	USN Amphibious Base – Coronado	This facility performed a Public Notification in 1997 and successfully implemented a risk reduction program. Public notifications are no longer required.
1993	Signet Armorlite – San Marcos	This facility performed a Public Notification and Public Meeting prior to the adoption of District Rule 1210. This facility completed a risk reduction effort and demonstrated attainment of Rule 1210 objectives with their updated 1993 HRA.
1994	Senior Flexonics, Ketema Aerospace and Electronics Division – El Cajon	This facility performed a Public Notification in 2001, held a Public Meeting, and implemented a risk reduction plan. Public notifications are no longer required.

(1) General Dynamics / Pacific Highway and Powerine Oil Co. performed health risk assessments based on 1989 emissions and have since discontinued operations.

(2) The health risk assessment and Public Notification/Risk Reduction status of Chromalloy, San Diego (El Cajon) is under review.

Recent and Expected Changes to the Program

In 1999, the ARB conducted an audit of the District Air Toxics "Hot Spots" program. ARB staff reviewed facility files, conducted extensive interviews of District staff, reviewed various District guidelines, rules and reports to gather information on implementation of the program. The audit evaluated all aspects of the program including: emissions inventory, prioritization, risk assessment, public notification, risk reduction, and audit plans.

Two audit recommendations by ARB could have significant impact on District implementation of the program. The first was for the District to reevaluate the cancer prioritization thresholds established by District prioritization procedures. The District requires a health risk assessment for facilities with cancer prioritization scores of 100 or greater. This threshold was based on the results of health risk assessments which indicated that facilities with prioritization scores below 100 typically did not have significant health risks. Facilities with cancer prioritization scores of 1 to 100 could be required to perform risk assessments if indicated based on additional factors such as receptor proximity, nearby sensitive receptors, local terrain, and frequency of nuisance complaints.

In response to this audit recommendation, the risk assessment cancer thresholds were reevaluated using the most recent Phase II/Phase III facility health risk assessment results. In addition, intermediate priority facilities were reviewed to determine potential health risk assessment requirements. Based on these analyses it appears the current prioritization procedure is appropriate for facilities that do not have very close receptors but may underestimate risk for facilities with very close receptors. CAPCOA and the District are evaluating potential revisions to the prioritization procedures to address close receptors, and further refine the procedure to include a review of sensitive receptors, multi-pathway pollutant emissions, nuisance history, and the presence of complex (elevated) terrain. These revisions are expected to ensure that all facilities that could potentially result in significant public health risk are evaluated. In addition, the District will perform screening health risk assessments for selected facilities in this group to evaluate potential health impacts. If a potential for significant health impacts is identified for any facilities in this group, those facilities will be required to prepare formal health risk assessments, and further revisions to prioritization procedures will be considered.

Second, ARB recommended that the District complete emission inventories for all industry-wide facilities and prepare screening HRAs in accordance with CAPCOA finalized guidelines. The District disagreed with this comment. Although the District has conducted inventories on these categories of sources several times, conducting site-specific risk assessments for hundreds of individual gas stations, dry cleaners, and autobody shops is not an effective or practical way to control these sources. This is a statewide issue and has been presented to ARB to address with the CAPCOA Air Toxics Workgroup.

The Air Toxics "Hot Spots" Act requires that OEHHA develop risk assessment guidelines for the Air Toxics "Hot Spots" Program, including a "likelihood of risks" approach to risk assessment. OEHHA has developed and published a series of Technical Support Documents for the determination of: (1) Acute Toxicity Exposure Levels, (2) Cancer Potency Factors, (3) Chronic Toxicity Exposure Levels, (4) Exposure Assessment and Stochastic Analysis, and (5) *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. To supplement OEHHA's guidelines, ARB has presented a *Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk* document.

The new OEHHA guidelines introduce numerous changes to the risk assessment process including incorporating new compounds and health values, preparing tiered analyses, performing stochastic risk analysis, evaluating alternate exposure scenarios, and significant changes to inhalation pathway calculations. These changes make preparation of health risk assessments using current tools impractical. ARB has developed a computer program that will enable the District to incorporate the numerous changes resulting from adoption of the new guidelines. The program, called HARP, includes emissions inventory, air dispersion modeling, risk assessment, and graphic display modules. The District reviewed a preliminary version of the software and reported its findings to ARB in May 2002. ARB is expected to make a final version of the software available in late 2003.

STREAMLINING EFFORTS

Two primary District goals are to develop an accurate and comprehensive basin-wide air toxic emissions inventory and to assist facilities in identifying areas for emission reductions. To accomplish these goals, the District has developed several measures to streamline the reporting requirements of the Air Toxics "Hot Spots" program. Examples include:

- Customized, site-specific emission inventory reporting forms are provided by the District to make it easier for facilities to supply required data. Facilities are only required to submit process information and do not have to perform emission calculations. In many cases, previously submitted information is pre-printed on the site-specific forms to minimize facility data acquisition time.

- The more complex facilities have been given the option of preparing emission inventory forms using a customized, site-specific software program developed and updated by the District.

- The District is continually expanding and improving a flexible emissions database system designed to standardize emission calculations and generate detailed, site-specific reports. Beginning with the 1997 inventories, all facility information has been processed using this database. This database has streamlined data collection, entry, computation, and reporting efforts resulting in cost savings for both industry and the District.

- The Toxics Engineering and Emissions Inventory sections have also combined the needs of both the Air Toxic "Hot Spots" Program and the Criteria Pollutant Emissions Inventory Program so that a single information request fulfills all facility inventory reporting requirements.

The "Hot Spots" program also requires OEHHA to review air district risk assessments to meet the requirements of the "Hot Spots" program. In February 1998, the District participated in an OEHHA training program that certifies air district staff to review screening risk assessments allowed under specific elements of the "Hot Spots" program. Certified District staff can approve, after limited and expedited technical review by OEHHA, screening risk assessments used to satisfy "Hot Spots" requirements. This benefits regulated facilities and the public by reducing the costs and time for reviewing such risk assessments.

QUALITY OF THE EMISSIONS INVENTORY DATA

The District's website contains site-specific data which represents toxic air contaminant emissions estimates. These emissions were determined using several different techniques, depending on the specific processes being evaluated.

Uniform emission quantification criteria and guidelines do not exist for many facilities. In these cases, emissions are estimated by conducting source tests, reviewing previous evaluations of similar operations, comparing materials used, or applying engineering judgment. Accordingly, the quality of emission estimates varies and a direct comparison of relative emissions between facilities may be inappropriate.

In the early stages of the program, hundreds of California facilities undertook similar inventory efforts concurrently, placing a tremendous demand on consultants and source testing firms. At the time, few people had extensive experience inventorying and testing air toxics. For some compounds and processes, test methods had not yet been developed and alternative techniques for estimation had to be used. Where source testing was used, results were sometimes inconsistent between facilities or between several tests of the same exhaust stack. Some test results conflicted with known process information, e.g., stack emissions of trace metals versus fuel composition data.

Some of these problems were related to the initial program startup and have been minimized as experience has been gained. Other problems are inherent to measuring very small quantities of trace compounds and applying emissions results from tests conducted over relatively few hours to a whole year of operation. Also, where the District had reason to suspect actual emissions of a toxic air contaminant reported as non-detectable, the District used the ARB-recommended practice of estimating the emission based on one-half the detection limit. Accordingly, consideration should be given to these issues when comparing emission estimates and any inferred health risks. The accuracy of the reported values can vary widely and current emission estimates may differ greatly from previously reported values.

AIR TOXICS CONTROL MEASURES

The objectives of the Air Toxics "Hot Spots" program are to develop a complete inventory of toxic air contaminant emission sources in California, to assess the potential public health risks associated with those emissions, and to require facilities with significant risks to reduce these risks to levels below the significant risk level. At the same time, existing and new programs at the local, state, and federal levels also reduce air toxics emissions.

At the state level, ARB continues to implement an ongoing program to identify toxic air contaminants, assess their public health risks, and develop air toxics control measures to reduce toxic emissions from specific source categories statewide. Under this program known as AB1807, or the Tanner program, ARB in cooperation with OEHHA develops priorities for identification of toxic compounds, investigates and documents the adverse health risks posed by such compounds, identifies statewide sources of emissions, evaluates public health risks and available control technologies, and approves statewide emission control measures. Local air districts then must implement the state-approved emission reduction measures.

ARB has recently adopted three additional Airborne Toxic Control Measures (ATCMs): a measure to reduce dioxin and other toxic emissions from outdoor residential waste burning; a measure requiring best available dust controls for construction, grading, quarrying, and surface mining operations in areas where naturally-occurring asbestos is likely to be found; and a measure to reduce hexavalent chromium and cadmium emissions from automotive coating operations.

ARB has estimated that a significant portion of the ambient cancer risk is due to diesel particulate exhaust. Therefore, as part of its Diesel Risk Reduction Program, ARB has adopted an ATCM regulating diesel-fueled school buses and commercial vehicles idling near schools. ARB is currently developing ATCMs to reduce other diesel emissions from mobile, stationary, and portable diesel engines. Based on the type of diesel engine, the proposed ATCMs will require the use of approved diesel fuels, limit particulate matter emissions per brake horsepower-hour, limit operating hours and/or require the use of add-on diesel particulate traps or filters.

Additionally, ARB is reviewing the existing ATCMs for chrome plating and chromic acid anodizing. As part of its study, ARB plans to evaluate remaining potential health risks, operations and maintenance practices, and control technologies.

In San Diego County, the Air Pollution Control Board has adopted statewide air toxics control measures (or is directly implementing state-wide measures) requiring:

- Expanded gasoline vapor recovery controls to further reduce benzene emissions.
- Hexavalent chromium emission controls for chrome plating and chromic acid anodizing operations.
- Hexavalent chromium emissions limits for cooling towers.
- Ethylene oxide emission controls for medical and commercial sterilizers.
- Dioxin emission controls from medical waste incinerators.
- Perchloroethylene emission controls for dry cleaning operations.
- Cadmium, arsenic, and nickel emission controls for metal melting operations.
- Methylene chloride, perchloroethylene, and trichloroehylene emission limits from automotive maintenance and repair activities.
- Elimination of hexavalent chromium and cadmium from automotive refinishing coatings.
- Elimination of residential open burning of trash in certain areas of the eastern portion of San Diego County.

At the federal level, the 1990 Clean Air Act Amendments greatly expanded the Environmental Protection Agency (EPA) program to develop nationwide control measures for air toxics. The Clean Air Act now lists 188 substances as hazardous air pollutants and requires EPA to develop control measures for significant sources of these pollutants. Many of these substances are included in the emissions being inventoried under the Air Toxics "Hot Spots" program. In addition, state and local permitting agencies are implementing National Emissions Standards for

Hazardous Air Pollutants (NESHAPs) for many new and modified sources of hazardous air pollutants. The NESHAPs applicable in San Diego County are presented in Table 7. Under revised state law, newly adopted federal NESHAPs regulations become state ATCMs automatically unless the state elects to adopt a separate regulation.

TABLE 7: NESHAPs Applicable in San Diego County

NESHAP	Approximate Number of Affected Facilities
Chromium Electroplating & Anodizing	20
Dry Cleaning	300
Aerospace Manufacturing & Rework Facilities	1
Shipbuilding and Repair (Surface Coating) Operations	2
Off-Site Waste & Recovery Operations	1
Halogenated Solvent Cleaning	15
Ethylene Oxide Sterilizing	1
Municipal Solid Waste Landfills	4
Miscellaneous Organic Chemicals Process	1

Other emission reduction programs designed to attain ambient air quality standards and protect stratospheric ozone also have significant effects on the magnitude of toxic emissions. For example, according to the state ARB, mobile sources in San Diego County emitted more than 21 million pounds of toxic air contaminants in 2002. Programs which encourage cleaner fuels, hybrid/electric cars, and reducing vehicle miles traveled and vehicle trips also serve to reduce air toxics emissions.

ARB and EPA adopt regulations for fuels sold commercially in California (primarily gasoline and diesel). These regulations control fuel properties to maximize emission benefits from engine emission control technologies. Cleaner fuel standards have yielded significant air quality benefits over the past 20 years, and even tighter fuel standards are planned in the future to provide additional emission reductions.

Additionally, both the District and ARB have established incentive programs to obtain early emission benefits of cleaner fuels and engines in San Diego County. Substantial funding has been allocated via the Motor Vehicle Registration Fee Program, the Carl Moyer Memorial Air Quality Standards Attainment Program, the Lower-Emission School Bus Replacement and Retrofit Program, and, most recently, the Power Generator Mitigation Fee Program. Collectively, these programs eliminate thousands of tons of diesel exhaust and ozone-precursor emissions in San Diego County.

District rules requiring reductions in the emissions of smog-forming organic compounds from stationary sources also reduce emissions of toxic air contaminants. For example, one San Diego facility emitted nearly 600,000 pounds of propylene oxide in 1988. By August of 1989, this facility had installed emission controls ten months ahead of the installation schedule required by District Rule 67.10. The propylene oxide emissions were reduced to approximately 37,000 pounds by 1990.

Another District air toxics control measure is Rule 1200 adopted on June 12, 1996. Rule 1200 (Toxic Air Contaminants - New Source Review) requires evaluation of potential health risks for any new, relocated, or modified emission unit which may increase emissions of one or more toxic air contaminants. The rule requires projects with an increase in cancer risk between one and ten in one million to install toxics best available control technology (T-BACT). Additionally, projects with an increase in cancer risk between ten and 100 in one million must meet significantly more stringent requirements to mitigate risks before they can be approved. As part of its process streamlining efforts, the District has established health protective, de minimis risk screening levels for Rule 1200 toxic air contaminants that allow many projects to be approved without more refined health risk assessments. In 2002, approximately 500 projects were subject to and evaluated under Rule 1200. Approximately 96 percent had an estimated risk below one in one million and the remaining 4 percent had an estimated risk of one to ten in one million and were required to use best available control technology (BACT). All sources had acute and chronic noncancer total hazard indices less than one. Many of the projects had initial estimated cancer risks greater than ten in one million but all reduced the estimated risk to below 10 in one million prior to issuance of authorities to construct. No projects were permitted under Rule 1200 with risks greater than ten in one million.

Beyond these federal, state, and District programs designed to control toxic air pollution, companies that participate in the Air Toxics "Hot Spots" program have taken voluntary steps to reduce their emissions of toxic air contaminants. Information provided to the District concerning these emission reduction efforts is now available in the Air Toxics section of the District's website.

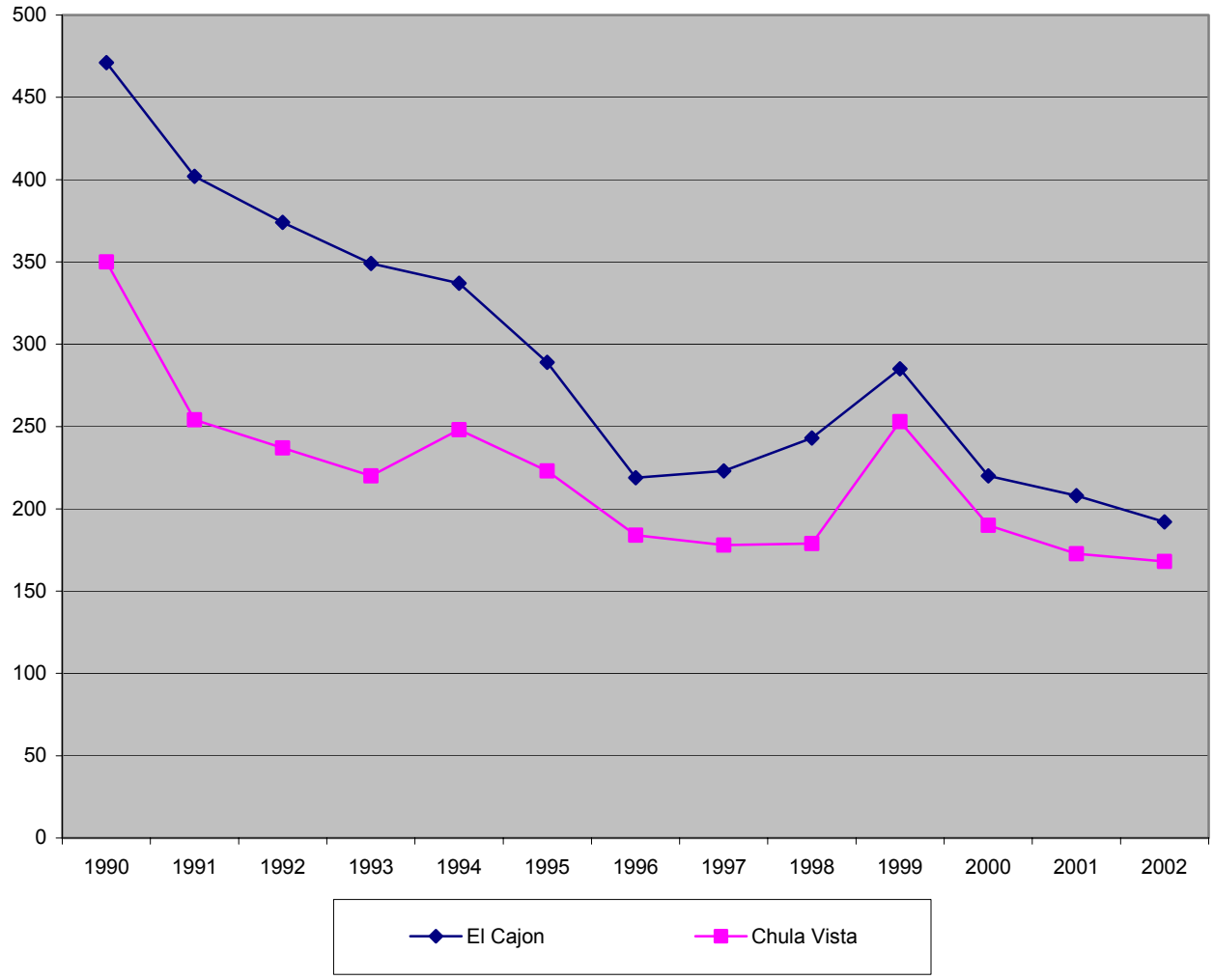
TOXIC AIR CONTAMINANTS AMBIENT MONITORING

The District started sampling for toxic air contaminants at the El Cajon and Chula Vista monitoring stations in the mid-1980s. This work, which is carried out in collaboration with ARB, provides information on ambient levels of a number of organic and inorganic toxic compounds. Integrated 24-hour air samples are performed once every twelve (12) days by the District. Staff of ARB analyze the samples and validate the data.

Exclusive of estimated ambient levels of diesel particulates, the ambient incremental cancer risk based on toxic air contaminant levels measured at both the Chula Vista and El Cajon monitoring stations has decreased since 1990 as shown in Figure 1. The estimated risk was 168 in one million for Chula Vista and 192 in one million for El Cajon in 2002. This represents an overall reduction of about 56 percent since 1990.

Diesel particulate also contributes significantly to ambient risk levels. Although a method does not exist to directly monitor diesel particulate concentrations, ARB has suggested methods that can be used to estimate diesel concentrations. Based on ARB estimates, diesel particulate emissions could add an additional 420 in one million to the ambient risk levels, in San Diego County. ARB estimates that risk from diesel particulate has decreased by about 50 percent from 870 in one million in 1990.

Figure 1 – Toxic Air Contaminant Incremental Cancer Risk



Barrio Logan Community

In response to a request by a community environmental group, the District in conjunction with the ARB monitored ambient concentrations of toxic compounds at a site (Memorial Academy) in the Barrio Logan area of San Diego from October 1999 to February 2001. Twenty-four hour samples were collected every four days during the study period. These samples were analyzed for toxic metals, polycyclic aromatic hydrocarbons (PAHs), carbonyl compounds, and volatile organic compounds.

Two reports of the result of the study have been prepared. The *Analysis of Air Toxics Data Collected in Barrio Logan, California from October 1999 through March 2000*, prepared by Sonoma Technology, Inc., is available on the District website under Air Toxics, Reports. Results from this report indicate that, for the monitoring period, ambient concentrations of toxic air contaminants in Barrio Logan were similar to the levels detected in Chula Vista and El Cajon with the following exceptions:

- Barrio Logan pollutant mean concentrations were more than one standard deviation lower than concentrations measured at Chula Vista from October 1999 through March 2000 for copper, chloroform, and methylene chloride.

- Barrio Logan pollutant mean concentrations were more than one standard deviation lower than concentrations measured in El Cajon from October 1999 through March 2000 for methyl chloroform and methylene chloride.

Results were also compared to the winter historical statewide and Los Angeles mean concentrations. October 1999 through March 2000 Barrio Logan mean pollutant concentrations were similar within a standard deviation of pollutant mean concentrations measured historically during the same months, both statewide and in Los Angeles for most toxic air contaminants, with the following exceptions:

- Barrio Logan pollutant mean concentrations were more than one standard deviation lower than concentrations measured statewide for methylene chloride, ortho-dichlorobenzene, para-dichlorobenzene, methyl chloroform, and cobalt.

- Barrio Logan pollutant mean concentration were more than one standard deviation higher than concentrations measured statewide for molybdenum, nickel, antimony, and tin.

- Barrio Logan pollutant mean concentrations were more than one standard deviation lower than concentrations measured in Los Angeles for acetaldehyde, formaldehyde, benzene, 1,3-butadiene, carbon tetrachloride, methylene chloride, ortho-dichlorobenzene, para-dichlorobenzene, perchloroethylene, trichloroethylene, methyl chloroform, copper, and cobalt.

- Barrio Logan pollutant mean concentrations were more than one standard deviation higher than concentrations measured in Los Angeles for molybdenum, antimony, and tin.

While a number of statistical measures can be used to evaluate the difference between two data sets, a common procedure is to use a difference of at least one standard deviation to signify a meaningful difference.

In addition, ARB has recently published a report titled *Air Quality at Memorial Academy Charter School in Barrio Logan, a Neighborhood Community in San Diego*. The following summary is from that report.

"Based on seventeen months of outdoor air measurements collected at Memorial Academy, [ARB] found overall air quality level at Barrio Logan to be similar to the San Diego region and to statewide averages. Some pollutants showed noticeable differences between Memorial Academy and other sites; however, the differences were not important in the overall health risk, and the measured levels of toxic pollutants are typical of urban areas in California. Diesel particulate matter, the primary contributor to health risks from urban toxic air pollutants, was not measured as part of this study."

Despite the results from monitoring at Memorial Academy, the community was still concerned that toxic air contaminant levels in Barrio Logan were high and requested additional ambient monitoring near two chrome plating facilities. In May 2001, hexavalent chromium was monitored in the area around the two chrome platers (Carlson & Beauloye and Master Plating) located on Newton Avenue. Some slightly elevated levels were measured but, because the monitor placement did not meet standard requirements, the measurements were not considered to be reliable. As a result, in December 2001, sampling for hexavalent chromium in the area around the two chrome platers was repeated.

During the December study, one-third of the daily air monitoring samples were found to be above the minimum level where hexavalent chromium can be measured accurately in the air. Some of these samples showed unexpectedly high levels.

Based on the December results, a more extensive study of ambient concentrations and activities at the plating facilities was conducted by the District and the ARB from February 5 until May 24, 2002. Several hundred air samples at a total of 20 sampling locations were collected and analyzed. Results were provided to the community and a local community work group was formed by Supervisor Greg Cox to better communicate the progress and results of the study. The workgroup included local residents, community and environmental interest groups, and government representatives.

In addition, several other actions were undertaken in an attempt to understand the hexavalent chromium sources and impacts including:

- Monitoring process operations at Master Plating and Carlson & Beauloye
- Stack emission testing at Carlson and Beauloye.
- Indoor air sampling at Master Plating and Carlson & Beauloye
- Joint surveys of the surrounding area to evaluate potential other hexavalant chrome sources.
- Indoor and outdoor soil and dust sampling.
- Air sampling to evaluate concentrations of other metals.

The findings of the study were as follows:

- While the levels of hexavalent chromium observed during the sampling period presented no immediate acute health impacts, the concentrations were of concern if experienced over a long term as they could result in a significant additional cancer risk.

- Emissions from Master Plating appeared to be a significant contributor to elevated ambient levels of hexavalent chromium measured for at least one residence between the facilities.

- Emissions from Master Plating appeared to be a combination of direct emissions from chrome plating, and fugitive emissions from hexavalent chromium contaminated dust.

Based on this information the County of San Diego sought an injunction to prevent Master Plating from conducting further chrome plating operations. On May 24, 2002 the Superior Court issued a Preliminary Injunction requiring Master Plating to cease chrome plating operations. Master Plating permanently ceased operations on October 15, 2002. By late December, the County of San Diego - Department of Environmental Health had completed the hazardous material cleanup inside the facility. With EPA's oversight, sections of contaminated soil were excavated from a localized area inside the facility. As of April 16, 2003, the facility has met federal Residential Preliminary Remediation Goals.

ARB has begun collecting additional information on emissions from other chrome plating operations elsewhere in the state. ARB will use that new information and the information gathered in the Barrio Logan study to evaluate the current statewide ATCM and potentially develop more stringent requirements in particular with regard to fugitive emission sources. EPA has proposed modifications to the NESHAP. The District has informed EPA of concerns not addressed in the NESHAP and commented on the proposed modifications. The ATCM and NESHAP regulations establish hexavalent chrome emission control standards for hard chrome plating, decorative chrome plating and chromic acid anodizing. Any new standards that may be adopted would apply to chrome platers throughout California, including those located in San Diego. The District will be evaluating additional measures to reduce potential fugitive hexavalent chromium dust emissions that are not yet addressed in the ATCM nor the NESHAP.

CONCLUSIONS

Industrial, commercial, and governmental facilities still emit large quantities of toxic air contaminants although emissions from industrial and commercial sources have been reduced by approximately 80% since 1989. Those sites inventoried to date emit more than three million pounds of toxic air contaminants annually. Motor vehicles and area and natural sources are also key contributors of toxic air contaminants, emitting more than 27 million pounds. Tables 1, 2, and 3 provide the current inventories of toxic pollutants for stationary, mobile, area, and natural sources. The majority of local facilities are in compliance with current District emission standards, which now focus on both criteria air pollutants (e.g., volatile organic compounds (VOC), oxides of nitrogen (NOx), particulate matter) and toxic air contaminants. Estimated emissions of toxic air contaminants from industrial sources have decreased by approximately nine million pounds per year since 1989.

Current and future air quality programs at the local, state, and federal levels will further reduce toxic air contaminants emissions. Measures to reduce vehicle trips and miles traveled will reduce toxic emissions which result from the burning of gasoline. Measures to reduce emissions of VOC as ozone precursors will also decrease emissions of toxic VOC.

State air toxics control measures are reducing emissions of perchloroethylene from dry cleaning operations, hexavalent chromium from plating operations, and toxic metals from metal melting operations. Federal emission control programs have produced dramatic emission reductions of chlorofluorocarbons (CFC) and methyl chloroform. The District also requires best available control technology for many new and modified sources of toxic air contaminants.

Over nine million pounds of industrial emission reductions have been quantified in San Diego County between 1989 and 2002. The most significant emission reductions are listed below.

	Emission Reductions (lbs/year)
1,1,1-Trichloroethane:	2,724,285
Chlorofluorocarbons (CFCs)*	1,964,691
Isopropyl Alcohol	1,711,487
Methylene Chloride	1,244,841
Perchloroethylene	923,519
Propylene Oxide	581,231
Silica, crystalline	401,165
Styrene	205,878
Methanol	178,546

* CFCs are stratospheric ozone depletors and are targeted for reduction and eventual elimination by Title VI of the 1990 Clean Air Act Amendments. Facilities were required to stop production and import of these chemicals by the turn of the century.

Most of the above reductions resulted from material substitutions, installing emission control equipment, and changes to a variety of manufacturing processes. For example, industrial emissions of perchloroethylene, a commercial drycleaning and industrial degreasing solvent, have been reduced by more than 75% as a result of emission control technologies and material substitutions. Many solvent-intensive products and manufacturing operations have been modified to use acetone and hydrochlorofluorocarbons (HCFC). These solvents are not toxic air contaminants under the Air Toxics "Hot Spots" program. Federal and state agencies have made

the determination that acetone and HCFCs are neither photochemically reactive nor ozone depletors. The District continues to quantify these compounds to ensure an accurate assessment of facility emissions and to monitor general industry material usage trends.

Some industrial source emission increases have occurred since 1989. The most significant increases are:

	Emission Increases (lbs/year)
Methyl Tert Butyl Ether	558,242
Methyl Ethyl Ketone	69,415
Butanol	61,844
Ethyl Benzene	44,277
Formaldehyde	34,308
Hydrogen Chloride	31,402
Methyl Isobutyl Ketone	31,251

Emission increases associated with methyl tertiary butyl ether (MTBE) are due to the use of this compound as a gasoline additive. ARB area and mobile source emission estimates have not been updated to account for this substance. The above estimate represents industrial sources and gasoline stations only. Total county-wide emissions may be significantly higher. California has now decided to phase-out use of MTBE as a gasoline additive due to its link to ground water contamination. This will reduce emissions of MTBE over the next several years, but will likely result in some increases in emissions of substitute additives such as ethanol. Ethanol is not a toxic air contaminant under the Hot Spots program but is a VOC. The District has not yet received the updated toxic air contaminant emissions composition of newer gasolines from ARB. Therefore, it should be noted that MTBE emissions are likely not representative of current gasoline emissions.

Formaldehyde and hydrogen chloride emission increases are associated with updated fuel combustion emission factors, installed NOx emission control equipment, increased landfill gas combustion, and more complete evaluations of chemical processing tanks. County-wide emission estimates of these materials for time periods prior to 1997 may be understated.

Although accurate estimates of emission increases are not available, it appears that methyl isobutyl ketone, ethyl benzene, methyl ethyl ketone, and a variety of alcohols are being used more frequently as solvents and thinners in surface coating and painting operations. Many coatings which previously contained chlorinated solvents have been reformulated with these substances. New and modified coating and solvent application operations requiring District permits and using these materials are reviewed to ensure no adverse public health impacts of concern.

Ongoing implementation of toxic air contaminant control programs such as the Air Toxics "Hot Spots" Program, District Rules 1200 (Toxic Air Contaminants - New Source Review) and 1210 (Toxic Air Contaminant Public Health Risks - Public Notification and Risk Reduction) will continue to reduce local public health risks associated with emissions of toxic air contaminants. Those efforts will improve information on levels of exposure and risk as well as identifying compounds, processes, and facilities that are potentially causing significant risks.