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

2001 Air Toxics "Hot Spots" Program Report for San Diego County

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SAN DIEGO COUNTY
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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 District's website (www.sdapcd.co.san-diego.ca.us) by selecting the Air Toxics button and then selecting "Emissions 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 76% over the past ten years, 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 (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 website. Estimates of area, natural, and mobile 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) (1990 ARB Report)	Total San Diego County emissions (lbs/year)
Toluene	253,536	5,474,718	5,728,254
Xylenes	205,297	4,044,958	4,250,255
Propylene	1,082	3,045,028	3,046,110
Benzene	23,853	2,032,266	2,056,119
Formaldehyde	67,269	1,335,896	1,403,165
Acetaldehyde	9,286	1,199,712	1,208,998
Glycol Ethers & Acetates	120,883	1,013,482	1,134,365
Manganese[2]	1,649	747,530	749,179
Ammonia	27,578	425,286	452,864
Zinc[2]	3,602	447,532	451,134
Phosphorous[2]	46	426,033	426,079
Methyl Tert Butyl Ether[1]	408,047	0	408,047
Isopropyl Alcohol[1]	305,750	0	305,750
Methanol	24,728	219,297	244,025
Silica, Crystalline[2]	227,043	0	227,043
Methylene Chloride	76,795	126,643	203,438
Methyl Ethyl Ketone	197,072	0	197,072
Perchloroethylene	192,300	0	192,300
Butanol	179,814	0	179,814
Hexane	170,716	0	170,716
Lead[2]	174	135,324	135,498
Styrene	117,959	0	117,959
Hydrochlorofluorocarbons[1]	100,026	0	100,026
Copper[2]	2,249	87,713	89,962
1,3-Butadiene	632	82,942	83,574
Polycyclic Aromatic Hydrocarbons (PAH), Unspecified[2]	489	79,580	80,069
Methyl Isobutyl Ketone	68,702	0	68,702
Nickel[2]	752	67,257	68,009
Naphthalene[2]	1,422	58,780	60,202
Hydrogen Chloride	52,528	0	52,528
Ethyl Benzene	50,525	0	50,525
Acrolein	446	44,819	45,265
1,1,1-Trichloroethane	22,449	0	22,449
1,2,4-Trimethylbenzene	18,350	0	18,350
Aluminum[2]	15,660	0	15,660
Hydrogen Sulfide	11,529	0	11,529

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) (1990 ARB Report)	Total San Diego County emissions (lbs/year)
Chlorobenzene	214	7,753	7,967
Cadmium[2]	29	6,383	6,412
Propylene Oxide	5,654	0	5,654
Phenol	5,252	0	5,252
Arsenic[2]	112	4939	5,051
Mercury[2]	60	4291	4,351
Trichloroethylene	3,693	0	3,693
Dimethyl Sulfide	3,663	0	3,663
Chlorofluorocarbons	3,593	0	3,593
Vinyl Chloride	3,482	0	3,482
Methyl Methacrylate	3,323	0	3,323
Sulfuric Acid	2,557	0	2,557
Acrylonitrile	2,529	0	2,529
2,2,4-Trimethylpentane	1,797	0	1,797
Hydrogen Fluoride	1,779	0	1,779
Ethylene Dichloride	1,721	0	1,721
Nitric Acid	1,666	0	1,666
Dioxane,1,4-	1,609	0	1,609
Ethylene Glycol	1,372	0	1,372
Barium[2]	1,273	0	1,273
Sodium Hydroxide	1,267	0	1,267
Chloroform	888	0	888
Selenium[2]	86	717	803
Chlorine	764	0	764
Carbon Disulfide	632	0	632
Dibutyl Phthalate[1]	445	0	445
Quinone	356	0	356
Dichlorobenzene	308	0	308
Vinyl Acetate	284	0	284
Carbonyl Sulfide	222	0	222
Carbon Tetrachloride	174	0	174
Vinylidene Chloride	140	0	140
Thallium[2]	106	0	106
Chromium, Hexavalent[2]	26	76	102
Methylene Diphenyl Diisocyanate[1]	96	0	96
Isocyanates	61	0	61
Crotonaldehyde	38	0	38
Cobalt[2]	27	0	27
Ethylene Oxide	16	0	16

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) (1990 ARB Report)	Total San Diego County emissions (lbs/year)
Benzyl Chloride	14	0	14
Silver[2]	5	0	5
Cyanide[1]	4	0	4
Totals	3,011,578	21,118,955	24,130,533

1 This compound was added to the Hot Spots list after initial emission estimates were made.

2 This compound is emitted as a particulate.

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 76% 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 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
1,1,1-Trichloroethane	22,449	2,727,662	-2,705,213
Isopropyl Alcohol	305,750	1,995,151	-1,689,401
Chlorofluorocarbons	3,593	1,967,653	-1,964,060
Methylene Chloride	76,795	1,318,102	-1,241,307
Perchloroethylene	192,300	1,188,914	-996,614
Propylene Oxide	5,654	587,686	-582,032
Silica, Crystalline	227,043	668,957	-441,914
Styrene	117,959	299,252	-181,293
Methanol	24,728	203,359	-178,631
Sodium Hydroxide	1,267	145,152	-143,885
Dioxane,1,4-	1,609	62,774	-61,165
Xylenes	205,297	243,196	-37,899
Hydrogen Sulfide	11,529	46,391	-34,862
Trichloroethylene	3,693	29,175	-25,482
Ammonia	27,578	49,492	-21,914
Zinc	3,602	17,517	-13,915
Propylene	1,082	14,860	-13,778
Toluene	253,536	266,164	-12,628
Hexane	170,716	181,000	-10,284
Ethylene Oxide	16	7,612	-7,596
Methyl Methacrylate	3,323	10,882	-7,559
Phenol	5,252	11,873	-6,621
2,2,4-Trimethylpentane	1,797	8,067	-6,270
Nickel	752	6,647	-5,895
Glycol Ethers & Acetates	120,883	126,333	-5,450
Carbon Tetrachloride	174	4,655	-4,481
Copper	2,249	6,230	-3,981
Lead	174	4,076	-3,902
Benzene	23,853	26,805	-2,952
Manganese	1,649	4,546	-2,897
Arsenic	112	2,198	-2,086
Vinyl Chloride	3,482	5,434	-1,952
Selenium	86	1,582	-1,496
Hydrogen Fluoride	1,779	3,078	-1,299
Mercury	60	1,187	-1,127
Chloroform	888	1,958	-1,070
Sulfuric Acid	2,557	3,600	-1,043
1,3-Butadiene	632	1,206	-574
Aluminum	15,660	16,000	-340
Isocyanates	61	355	-294
Chromium, Hexavalent	26	245	-219
Cadmium	29	226	-197
Naphthalene	1,422	1,615	-193
Beryllium	3	118	-115
Cyanide*	4	nk	nk
Silver	5	0	5
Benzyl Chloride	14	0	14
Phosphorous	46	30	16
Cobalt	27	0	27

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
Crotonaldehyde	38	0	38
Chlorobenzene	214	170	44
Methylene Diphenyl Diisocyanate*	96	nk	nk
Thallium	106	0	106
Vinylidene Chloride	140	0	140
Ethylene Dichloride	1,721	1,536	185
Carbonyl Sulfide	222	0	222
Barium	1,273	1,000	273
Vinyl Acetate	284	0	284
Dichlorobenzene	308	0	308
PAH, Unspecified	489	165	324
Quinone	356	0	356
Dibutyl Phthalate*	445	nk	nk
Acrolein	446	0	446
Carbon Disulfide	632	0	632
Chlorine	764	0	764
Ethylene Glycol	1,372	0	1,372
Nitric Acid	1,666	0	1,666
Acrylonitrile	2,529	0	2,529
Dimethyl Sulfide	3,663	0	3,663
Acetaldehyde	9,286	28	9,258
1,2,4-Trimethylbenzene	18,350	0	18,350
Methyl Isobutyl Ketone	68,702	42,000	26,702
Hydrogen Chloride	52,528	21,443	31,085
Ethyl Benzene	50,525	16,000	34,525
Formaldehyde	67,269	26,408	40,861
Butanol	179,814	116,000	63,814
Methyl Ethyl Ketone	197,072	119,000	78,072
Hydrochlorofluorocarbons*	100,026	nk	nk
Methyl Tert Butyl Ether*	408,047	nk	408,047
Totals	3,011,578	12,712,791	-9,701,213

* 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.

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

Toxic Air Contaminants	Mobile Source Emissions (lbs/year) (1990 ARB Report)	Area Source Emissions (lbs/year) (1990 ARB Report)	Natural Source Emissions (lbs/year) (1990 ARB Report)	Total Non-Industrial Source Emissions (lbs/year)
Toluene	4,954,347	520,371	0	5,474,718
Xylenes	3,415,658	629,300	0	4,044,958
Propylene	2,361,534	89,261	594,233	3,045,028
Benzene	1,636,866	395,400	0	2,032,266
Formaldehyde	1,243,572	92,324	0	1,335,896
Acetaldehyde	1,178,761	20,951	0	1,199,712
Glycol Ethers & Acetates	0	1,013,482	0	1,013,482
Manganese	500	744,050	2,980	747,530
Zinc	174,533	271,226	1,773	447,532
Phosphorous	729	422,185	3,119	426,033
Ammonia	19,692	35,914	369,680	425,286
Methanol	0	219,297	0	219,297
Lead	35,446	98,927	951	135,324
Methylene Chloride	0	126,643	0	126,643
Copper	542	86,739	432	87,713
1,3-Butadiene	0	7,225	75,717	82,942
PAH, Unspecified	0	79,580	0	79,580
Nickel	453	66,457	347	67,257
Naphthalene	4,858	53,922	0	58,780
Acrolein	44,819	0	0	44,819
Chlorobenzene	5,511	2,242	0	7,753
Cadmium	400	4,966	1,017	6,383
Arsenic	18	4,858	63	4,939
Mercury	149	3,920	222	4,291
Selenium	24	611	82	717
Chromium, Hexavalent	18	58	0	76
Totals:	15,078,430	4,989,909	1,050,616	21,118,955

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 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.

Each facility required to conduct a health risk assessment must submit a detailed protocol for District approval. The protocol describes how the health risk assessment will be done, including the dispersion modeling used to estimate public exposures to the toxic air contaminants emitted. Procedures proposed in the protocol must comply with the "Air Toxics 'Hot Spots' Program Risk Assessment Guidelines" published by the California Air Pollution Control Officers Association (CAPCOA). New guidelines developed by the ARB and OEHHA entitled "The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments" are currently available in draft form. Final approval by the state's Scientific Review Panel is scheduled for late 2002.

After the District approves the protocol, the facility prepares a health risk assessment. 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.

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.

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 is currently prioritizing facilities based on the most recent approved emissions inventories to determine where new health risk assessments are required. Approximately 45 new or updated health risk assessments will be required over the next two years. However, work on these cannot start until new standard tools and methodologies are made available by ARB and OEHHA.

The District may also perform 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.	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
1998	USN Air Station/North Island (1, 9)	Coronado	15	<0.1	0.20	1.3
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	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
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

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	Teledyne Ryan Aeronautical (1)	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 has reduced estimated risk (see Table 6).

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.

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

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

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 Manuf,, Inc. – San Marcos	This facility performed a Public Notification in 2001.
1993	USN Point Loma Naval Complex-San Diego	This facility performed a Public Notification in 1997 and 1999.
1993	National Steel & Shipbuilding – San Diego	This facility performed a Public Notification in 1997, 1999, and 2002.
1993	USMC Miramar / USN Miramar – San Diego	This facility performed a Public Notification in 1997 and 1999.
1993	USN Navy Station, 32nd St. – San Diego	This facility performed a Public Notification in 1997, 1999, and 2001.
1993	Santa Fe Pacific Pipeline – San Diego	The 1993 Emissions Based HRA for this site was received 2/14/97. This facility performed a Public Notification on 5/14/97 based on 1989 HRA results. This facility held a Public Meeting. Risks are 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 completed a risk reduction program.
1995	Campbell Marine – San Diego	This facility performed a Public Notification in 2001 and has since discontinued operations.
1994	Hues Metal Finishing – San Marcos	This facility performed a Public Notification in 2000 and successfully completed a risk reduction program.
1995	Flame Spray Inc. – San Diego	This facility performed a Public Notification in 2000 and held a Public Meeting. Risk reduction test results are under evaluation.
1993	USN Air Station/North Island – Coronado	This facility performed a Public Notification in 1997 and 2001, held a Public Meeting and successfully demonstrated risk reduction.
1993	Chem-tronics, Inc. – El Cajon	This facility performed a Public Notification in 1997, held a Public Meeting and successfully completed a risk reduction program.
1993	USN Amphibious Base – Coronado	This facility performed a Public Notification in 1997 and successfully completed a risk reduction program.
1993	Signet Armorlite – San Marcos	This facility performed a Public Notification and Public Meeting prior to the adoption of District Rule 1210. This site has also 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 and held a Public Meeting. A risk reduction program has been implemented and is under evaluation.

(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 is 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. Additionally, the District calculates two separate noncancer prioritization scores (chronic and acute) instead of a single combined value.

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 disagrees 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 that ARB should address in collaboration 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 recently 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, and (4) Exposure Assessment and Stochastic Analysis. In addition, OEHHA recently issued "The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments" for public comment. This will provide new guidance for preparing air toxics risk assessments. The technical support document will be issued upon completion of public comments and after review by the Scientific Review Panel (SRP).

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 is developing 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. The District recommended improvements to the software's ease of use and it's ability to share data with existing emission inventory and air dispersion modeling tools. ARB plans to make a final version of the software available after approval of the "The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments" in the second half of 2002.

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 is currently developing Air Toxic Control Measures (ATCM) to reduce emissions of diesel exhaust from mobile and stationary diesel engines and has adopted a measure to reduce hexavalent chromium, cadmium, and lead emissions from automobile refinishing operations. ARB has also modified its regulations to reduce the allowable asbestos content of road surfacing materials. Additionally, ARB is reviewing the existing ATCM 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.
- Limitations on the serpentine asbestos content of rock used or sold for use on roads and other traffic surfaces.

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. The District is working with other California stakeholders (ARB, CAPCOA, industry groups, environmental organizations) to negotiate with the EPA practical, cost-effective, and enforceable methods to integrate these new federal requirements with existing California and local toxic air contaminant control programs.

TABLE 7: NESHAPs Applicable in San Diego County

NESHAP	Approx. No of Affected Facilities
Chromium Electroplating & Anodizing	20
Dry Cleaning	300
Aerospace Manufacturing & Rework Facilities	1
Shipbuilding and Repair (Surface Coating) Operations	2
Gasoline Distribution (Bulk Terminals)	no expected major source
Wood Furniture Manufacturing	no expected major source
Boat Manufacturing	no expected major source
Printing & Publishing	no expected major source
R&D Facilities	no expected major source
Off-Site Waste & Recovery Operations	1
Halogenated Solvent Cleaning	15
Ethylene Oxide Sterilizing	1
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, motor vehicles in San Diego County emitted more than 15 million pounds of toxic air contaminants in 1989. 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. In calendar 2001, about 164 projects were reviewed under Rule 1200. Approximately 85 percent had an estimated risk below one in one million and the remaining 15 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 172 in one million for Chula Vista and 208 in one million for El Cajon in 2001. This represents an overall reduction of over 50 percent over the past decade.

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 in the past ten years from 870 in one million in 1990.

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, polynuclear 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 preliminary findings of the study are as follows:

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

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

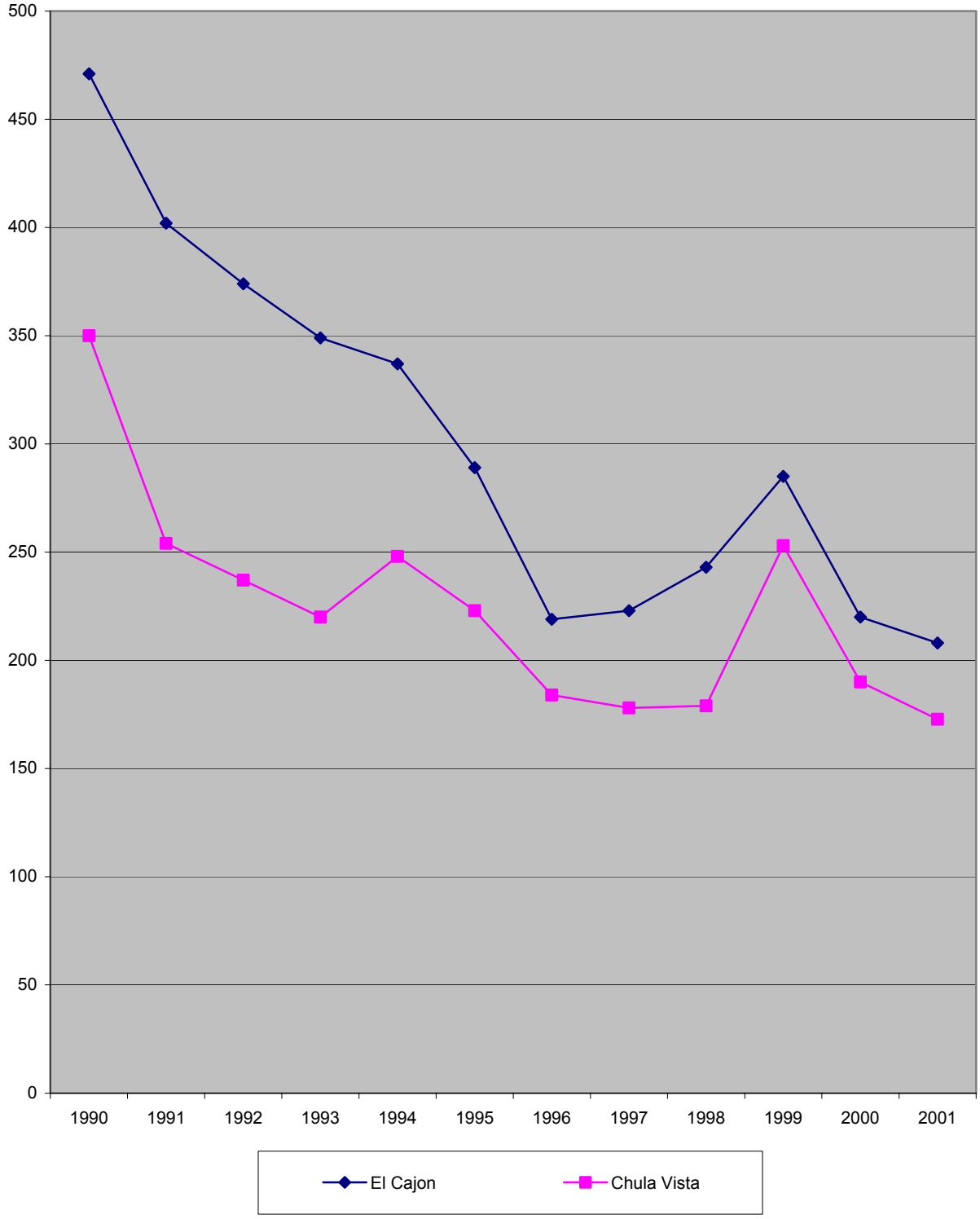
- Emissions from Master Plating appear to be a combination of direct emissions from chrome plating, and fugitive emissions from hexavalent chromium contaminated dust.

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. A final court ruling on the County's demand that Master Plating permanently cease chrome plating operations has not yet been scheduled. Coordinated efforts are being made to relocate Master Plating.

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 Air Toxic Control Measure and potentially develop more stringent requirements. The Air Toxic Control Measure establishes 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 continue to inspect chrome plating operations and other potential sources of hexavalent chromium in the Barrio Logan neighborhood. Analyses of collected air monitoring data will continue. If any additional immediate corrective action becomes necessary, those actions will be reported on the District website (www.sdapcd.co.san-diego.ca.us) and provided to the community by direct mailings.

Figure 1 – Toxic Air Contaminant Incremental Cancer Risk



CONCLUSIONS

Industrial, commercial, and governmental facilities still emit large quantities of toxic air contaminants although emissions have been reduced by approximately 76% over the past ten years. 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 20 million pounds in 1989. 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 have now become focused on both criteria air pollutants (e.g., VOCs, oxides of nitrogen, particulate matter) and toxic air contaminants. Estimated emissions of toxic air contaminants from industrial sources have decreased by approximately eight 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 VOCs as ozone precursors will also decrease emissions of toxic VOCs.

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 (CFCs) and methyl chloroform. The District also requires best available control technology for many new and modified sources of toxic air contaminants.

Over eight million pounds of industrial emission reductions have been quantified in San Diego County between 1989 and 2001. The most significant emission reductions are listed below.

	Emission Reductions (lbs/year)
1,1,1-Trichloroethane:	2,705,213
Chlorofluorocarbons (CFCs)*	1,964,060
Isopropyl Alcohol	1,689,401
Methylene Chloride	1,241,307
Perchloroethylene	996,614
Propylene Oxide	582,032
Silica, crystalline	441,914
Styrene	181,293
Methanol	178,631

*CFC's 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 80% 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's). 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 HCFC's 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	408,047
Methyl Ethyl Ketone	78,072
Butanol	63,814
Formaldehyde	40,861
Ethyl Benzene	34,525
Hydrogen Chloride	31,085
Methyl Isobutyl Ketone	26,702

Emission increases associated with methyl tertiary butyl ether (MTBE) are due to the relatively recent 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.

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.