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

2000 Air Toxics "Hot Spots" Program Report for 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 streamlining efforts. 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 web site (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 in San Diego County have been reduced by more than 65% 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 law. 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 1201) 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 submitted data, 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 63 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 several hundred District evaluations of individual stationary sources, as well as emission surveys of 337 auto body shops, 690 gasoline stations, and 291 dry cleaners. Table 2 provides emission estimates for these industrial source categories. Detailed emission inventories for individual facilities are available on the District web site.

Table 1: Estimated Toxic Air Contaminant Emissions - All Sources

Toxic Air Contaminants	Total Industrial Source emissions (lbs/year) (1997 - 1999 estimates)	Total Non-Industrial Source emissions (lbs/year) (1990 ARB Report)	Total San Diego County emissions (lbs/year)
Toluene	235,789	5,474,718	5,710,507
Xylenes	162,936	4,044,958	4,207,894
Propylene	1,085	3,045,028	3,046,113
Benzene	43,825	2,032,266	2,076,091
Isopropyl Alcohol	1,495,151	0	1,495,151
Formaldehyde	100,910	1,335,896	1,436,806
Acetaldehyde	3,670	1,199,712	1,203,382
Glycol Ethers & Acetates	72,906	1,013,482	1,086,388
Manganese	1,627	747,530	749,157
Perchloroethylene	537,511	0	537,511
Ammonia	40,148	425,286	465,434
Zinc	4,272	447,532	451,804
Phosphorous	44	426,033	426,077
Methyl Tert Butyl Ether	330,417	0	330,417
Methylene Chloride	104,145	126,643	230,788
Methanol	9,560	219,297	228,857
Silica, Crystalline	205,536	0	205,536
Butanol	160,661	0	160,661
Methyl Ethyl Ketone	144,965	0	144,965
Lead	230	135,324	135,554
Copper	1,180	87,713	88,893
1,3-Butadiene	224	82,942	83,166
PAH, Unspecified	301	79,580	79,881
Nickel	438	67,257	67,695
Hexane	62,208	0	62,208
Naphthalene	1,141	58,780	59,921
Styrene	56,015	0	56,015
Methyl Isobutyl Ketone	54,567	0	54,567
Acrolein	5	44,819	44,824
1,2,4-Trimethylbenzene	43,433	0	43,433
Hydrogen Chloride	41,881	0	41,881
Ethyl Benzene	39,411	0	34,411
1,1,1-Trichloroethane	28,505	0	28,505
Propylene Oxide	22,716	0	22,716
2,2,4-Trimethylpentane	15,884	0	15,884
Aluminum	15,394	0	15,394
Hydrogen Sulfide	11,603	0	11,603
Chlorobenzene	247	7,753	8,000
Cadmium	25	6,383	6,408
Trichloroethylene	6,122	0	6,122
Phenol	5,681	0	5,681
Chlorofluorocarbons	5,587	0	5,587
Arsenic	73	4,939	5,012
Dimethyl Sulfide	4,483	0	4,483
Mercury	38	4,291	4,329
Vinyl Chloride	4,033	0	4,033
Ethylene Glycol	3,975	0	3,975
Acrylonitrile	2,939	0	2,939
Nitric Acid	2,908	0	2,908
Methyl Methacrylate	2,881	0	2,881

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

Toxic Air Contaminants	Total Industrial Source emissions (lbs/year) (1997 - 1999 estimates)	Total Non-Industrial Source emissions (lbs/year) (1990 ARB Report)	Total San Diego County emissions (lbs/year)
Sulfuric Acid	2,155	0	2,155
Sodium Hydroxide	1,530	0	1,530
Ethylene Dichloride	1,168	0	1,168
Dioxane, 1,4-	894	0	894
Selenium	44	717	761
Barium	724	0	724
Chlorine	680	0	680
Hydrogen Fluoride	647	0	647
Carbon Disulfide	554	0	554
Chloroform	435	0	435
Quinone	356	0	356
Carbonyl Sulfide	335	0	335
Dichlorobenzene	165	0	165
Vinylidene Chloride	164	0	164
Isocyanates	104	0	104
Chromium, Hexavalent	23	76	99
Thallium	82	0	82
Crotonaldehyde	38	0	38
Carbon Tetrachloride	38	0	38
Vinyl Acetate	34	0	34
Ethylene Oxide	22	0	22
Silver	12	0	12
Cobalt	12	0	12
Benzyl Chloride	10	0	10
Beryllium	2	0	2
Totals:	4,099,518	21,118,955	25,218,473

Table 2: Estimated Toxic Air Contaminant Emissions-Industrial Sources

Toxic Air Contaminants	Total Stationary Source emissions (lbs/year) (1997 - 1999 estimates)	Total Auto Body Shop emissions (lbs/year) (1997 survey information)	Total Gasoline Station emissions (lbs/year) (1997 survey information)	Total Dry Cleaner emissions (lbs/year) (1997 survey information)	Total Industrial Source emissions (lbs/year)
Isopropyl Alcohol	1,484,898	10,253	0	0	1,495,151
Perchloroethylene	5,953	0	0	531,558	537,511
Methyl Tert Butyl Ether	137,646	0	192,771	0	330,417
Toluene	153,033	32,467	50,289	0	235,789
Silica, Crystalline	205,536	0	0	0	205,536
Xylenes	92,334	54,682	15,920	0	162,936
Butanol	143,573	17,088	0	0	160,661
Methyl Ethyl Ketone	97,118	47,847	0	0	144,965
Methylene Chloride	104,145	0	0	0	104,145
Formaldehyde	100,910	0	0	0	100,910
Glycol Ethers & Acetates	67,609	5,297	0	0	72,906
Hexane	26,017	0	36,191	0	62,208
Styrene	56,015	0	0	0	56,015
Methyl Isobutyl Ketone	25,517	29,050	0	0	54,567
Benzene	33,817	598	9,410	0	43,825
1,2,4-Trimethylbenzene	43,023	410	0	0	43,433
Hydrogen Chloride	41,881	0	0	0	41,881
Ammonia	40,148	0	0	0	40,148
Ethyl Benzene	27,363	3,418	8,630	0	39,411
1,1,1-Trichloroethane	28,505	0	0	0	28,505
Ethylene Glycol Butyl Ether	24,590	0	0	0	24,590
Propylene Oxide	22,716	0	0	0	22,716
2,2,4-Trimethylpentane	15,884	0	0	0	15,884
Aluminum	15,394	0	0	0	15,394
Hydrogen Sulfide	11,603	0	0	0	11,603
Methanol	9,560	0	0	0	9,560
Trichloroethylene	6,122	0	0	0	6,122
Phenol	5,681	0	0	0	5,681
Chlorofluorocarbons	5,587	0	0	0	5,587
Dimethyl Sulfide	4,483	0	0	0	4,483
Zinc	4,272	0	0	0	4,272
Vinyl Chloride	4,033	0	0	0	4,033
Ethylene Glycol	3,975	0	0	0	3,975
Acetaldehyde	3,670	0	0	0	3,670
Acrylonitrile	2,939	0	0	0	2,939
Nitric Acid	2,908	0	0	0	2,908
Methyl Methacrylate	2,881	0	0	0	2,881
Sulfuric Acid	2,155	0	0	0	2,155
Manganese	1,627	0	0	0	1,627
Sodium Hydroxide	1,530	0	0	0	1,530
Copper	1,180	0	0	0	1,180
Ethylene Dichloride	1,168	0	0	0	1,168
Naphthalene	1,141	0	0	0	1,141
Propylene	1,085	0	0	0	1,085
Dioxane, 1,4-	894	0	0	0	894
Barium	519	205	0	0	724
Chlorine	680	0	0	0	680
Hydrogen Fluoride	647	0	0	0	647
Carbon Disulfide	554	0	0	0	554

Table 2: Estimated Toxic Air Contaminant Emissions-Industrial Sources - continued

Nickel	438	0	0	0	438
Chloroform	435	0	0	0	435
Quinone	356	0	0	0	356
Carbonyl Sulfide	335	0	0	0	335
PAH, Unspecified	301	0	0	0	301
Chlorobenzene	247	0	0	0	247
Lead	230	0	0	0	230
1,3-Butadiene	224	0	0	0	224
Dichlorobenzene	165	0	0	0	165
Vinylidene Chloride	164	0	0	0	164
Isocyanates	104	0	0	0	104
Thallium	82	0	0	0	82
Arsenic	73	0	0	0	73
Selenium	44	0	0	0	44
Phosphorous	44	0	0	0	44
Mercury	38	0	0	0	38
Crotonaldehyde	38	0	0	0	38
Carbon Tetrachloride	38	0	0	0	38
Vinyl Acetate	34	0	0	0	34
Cadmium	25	0	0	0	25
Chromium, Hexavalent	23	0	0	0	23
Ethylene Oxide	22	0	0	0	22
Silver	12	0	0	0	12
Cobalt	12	0	0	0	12
Benzyl Chloride	10	0	0	0	10
Acrolein	5	0	0	0	5
Beryllium	2	0	0	0	2
Totals:	3,053,434	201,315	313,211	531,558	4,099,518

Facilities are required to update their emission inventory reports at least every four years. The first cycle of emission inventories was completed in 1989 (Phase I), 1990 (Phase II), and 1991 (Phase III and Survey Sites). The second cycle of emission inventories occurred in 1993 (Phase I), 1994 (Phase II), and 1995 (Phase III). The District is currently completing the third cycle of emissions inventories for 1997 (Phase I), 1998 (Phase II), and 1999 (Phase III). Cycle 3 emission estimates have not been finalized for a few large sources.

In 1990, ARB prepared a toxic emissions report inventory for non-industrial sources (mobile, area, and natural sources) in San Diego County. Total non-industrial source emissions are presented in Table 1. A summary of emissions for the mobile, area, and natural source subcategories is 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.

Many improved emission speciation profiles, calculation methodologies, and emission factors have been used to estimate the toxic air contaminants released during second and third cycles. 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 Cycle 1. In other instances, additional compounds have been identified and emissions of some toxic air contaminants have increased.

A comparison of historical industrial source emission estimates for cycles 1, 2, and 3 is provided in Table 4. Overall, local emissions of toxic air contaminants from industrial sources have decreased by more than 65% since 1989. The most significant reductions include a variety of chlorinated solvents and heavy metals. Emission increases are primarily the result of newly introduced gasoline additives, nonchlorinated replacement solvents, and updated combustion emission factors. Detailed site-specific emission results are provided on the District web site.

Table 3: 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
1,1,1-Trichloroethane	0	0	0	0
1,2,4-Trimethylbenzene	0	0	0	0
2,2,4-Trimethylpentane	0	0	0	0
Acrylonitrile	0	0	0	0
Butanol	0	0	0	0
Carbon Disulfide	0	0	0	0
Carbon Tetrachloride	0	0	0	0
Carbonyl Sulfide	0	0	0	0
Chlorine	0	0	0	0
Chlorofluorocarbons	0	0	0	0
Chloroform	0	0	0	0
Cobalt	0	0	0	0
Crotonaldehyde	0	0	0	0
Dichlorobenzene	0	0	0	0
Dimethyl Sulfide	0	0	0	0
Dioxane, 1, 4-	0	0	0	0
Ethyl Benzene	0	0	0	0
Ethylene Dichloride	0	0	0	0
Ethylene Glycol	0	0	0	0
Ethylene Glycol Butyl Ether	0	0	0	0
Ethylene Oxide	0	0	0	0
Hexane	0	0	0	0
Hydrogen Chloride	0	0	0	0

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

Hydrogen Fluoride	0	0	0	0
Hydrogen Sulfide	0	0	0	0
Isocyanates	0	0	0	0
Isopropyl Alcohol	0	0	0	0
Methyl Ethyl Ketone	0	0	0	0
Methyl Isobutyl Ketone	0	0	0	0
Methyl Methacrylate	0	0	0	0
Methyl Tert Butyl Ether	0	0	0	0
Nitric Acid	0	0	0	0
Perchloroethylene	0	0	0	0
Phenol	0	0	0	0
Propylene Oxide	0	0	0	0
Quinone	0	0	0	0
Silica, Crystalline	0	0	0	0
Silver	0	0	0	0
Sodium Hydroxide	0	0	0	0
Styrene	0	0	0	0
Sulfuric Acid	0	0	0	0
Thallium	0	0	0	0
Trichloroethylene	0	0	0	0
Vinyl Acetate	0	0	0	0
Vinyl Chloride	0	0	0	0
Vinylidene Chloride	0	0	0	0
Totals:	15,078,430	4,989,909	1,050,616	21,118,955

Table 4: Historical Toxic Air Contaminant Emissions - Industrial Sources

Toxic Air Contaminants	Total Industrial Source emissions (lbs/year) Cycle 1 - (1989 - 1991)	Total Industrial Source emissions (lbs/year) Cycle 2 - (1993 - 1995)	Total Industrial Source emissions (lbs/year) Cycle 3 - (1997 - 1999)	Difference (lbs/year) Cycle 1 to Cycle 3
1,1,1-Trichloroethane	2,727,662	2,102,871	28,505	-2,699,157
Chlorofluorocarbons	1,967,653	528,703	5,587	-1,962,066
Methylene Chloride	1,318,102	287,618	104,145	-1,213,957
Perchloroethylene	1,188,914	1,000,279	537,511	-651,403
Propylene Oxide	587,686	25,115	22,716	-564,970
Isopropyl Alcohol*	2,000,000	2,043,507	1,495,151	-504,849
Silica, Crystalline	668,957	248,637	205,536	-463,421
Styrene	299,252	66,503	56,015	-243,237
Methanol	203,359	75,785	9,560	-193,799
Sodium Hydroxide	145,152	2,936	1,530	-143,622
Hexane *	181,000	180,731	62,208	-118,792
Xylenes	243,196	217,128	162,936	-80,260
Dioxane, 1,4-	62,774	6,585	894	-61,880
Glycol Ethers & Acetates	126,333	95,324	72,906	-53,427
Hydrogen Sulfide	46,391	20,399	11,603	-34,788
Toluene	266,164	199,184	235,789	-30,375
Trichloroethylene	29,175	31,190	6,122	-23,053
Propylene	14,860	0	1,085	-13,775
Zinc	17,517	5,839	4,272	-13,245
Ammonia	49,492	4,568	40,148	-9,344
Methyl Methacrylate	10,882	345	2,881	-8,001
Ethylene Oxide	7,612	359	22	-7,590
Nickel	6,647	3,733	438	-6,209
Phenol	11,873	9,813	5,681	-6,192
Copper	6,230	3,142	1,180	-5,050
Carbon Tetrachloride	4,655	10	38	-4,617
Lead	4,076	253	230	-3,846
Manganese	4,546	1,487	1,627	-2,919
Hydrogen Fluoride	3,078	2,133	647	-2,431
Arsenic	2,198	158	73	-2,125
Selenium	1,582	100	44	-1,538
Chloroform	1,958	1,725	435	-1,523
Sulfuric Acid*	3,600	3,616	2,155	-1,445
Vinyl Chloride	5,434	7,075	4,033	-1,401
Mercury	1,187	64	38	-1,149
1,3-Butadiene	1,206	90	224	-982
Aluminum	16,000	37	15,394	-606
Naphthalene	1,615	148	1,141	-474
Ethylene Dichloride	1,536	1,242	1,168	-368
Barium*	1,000	1,088	724	-276
Isocyanates	355	192	104	-251
Chromium, Hexavalent	245	92	23	-222
Cadmium	226	23	25	-201
Beryllium	118	9	2	-116
Acrolein	0	0	5	5
Benzyl Chloride	0	0	10	10
Cobalt	0	0	12	12
Silver	0	0	12	12
Phosphorous	30	0	44	14
Vinyl Acetate	0	0	34	34
Crotonaldehyde	0	0	38	38
Chlorobenzene	170	1,976	247	77
Thallium	0	0	82	82
PAH, Unspecified	165	489	301	136

Table 4: Historical Toxic Air Contaminant Emissions - Industrial Sources - continued

Toxic Air Contaminants	Total Industrial Source emissions (lbs/year) Cycle 1 - (1989 - 1991)	Total Industrial Source emissions (lbs/year) Cycle 2 - (1993 - 1995)	Total Industrial Source emissions (lbs/year) Cycle 3 - (1997 - 1999)	Difference (lbs/year) Cycle 1 to Cycle 3
Vinylidene Chloride	0	0	164	164
Dichlorobenzene	0	0	165	165
Carbonyl Sulfide	0	0	335	335
Carbon Disulfide	0	0	554	554
Chlorine	0	0	680	680
Nitric Acid	0	0	2,908	2,908
Acrylonitrile	0	0	2,939	2,939
Acetaldehyde	28	3,618	3,670	3,642
Ethylene Glycol	0	0	3,975	3,975
Dimethyl Sulfide	0	0	4,483	4,483
2,2,4-Trimethylpentane	8,067	7,000	15,884	7,817
Methyl Isobutyl Ketone*	42,000	41,828	54,567	12,567
Benzene	26,805	20,377	43,825	17,020
Hydrogen Chloride	21,443	17,217	41,881	20,438
Ethyl Benzene*	16,000	16,363	39,411	23,411
Methyl Ethyl Ketone*	119,000	118,958	144,965	25,965
1,2,4-Trimethylbenzene	0	0	43,433	43,433
Butanol*	116,000	115,893	160,661	44,661
Formaldehyde	26,408	27,827	100,910	74,502
Methyl Tert Butyl Ether*	0	0	330,417	330,417
Totals:	12,617,614	7,551,382	4,099,518	-8,518,096

* Compound was added to the Air Toxic list in June 1991. Emissions for 1989 - 1991 have been estimated for comparison purposes.

Note: Potential health impacts from emission increases or reductions of different contaminants are not comparable on a pound-for-pound basis.

Facility Prioritization

The District, ARB, and California Department of Health Services (now OEHHA) developed procedures to determine which sites would be required to prepare health risk assessments in late 1990. These prioritization procedures consider the magnitude of toxic air contaminant emissions from the facilities and the toxicity of those emissions, but do not consider the dilution characteristics of the specific facility's exhaust stacks or the expected health risks posed by the emissions. The purpose of facility prioritization is to identify facilities that warrant a detailed evaluation of the latter factors through preparing a health risk assessment. Requiring a facility to prepare a risk assessment does not mean the facility poses a significant risk to public health.

The District incorporates a receptor proximity adjustment factor in the prioritization procedure which decreases the facility score (and potentially priority) for sites that do not have nearby receptors. Additionally, the District calculates two separate noncancer prioritization scores (chronic and acute) instead of a single combined value. These prioritization procedures are consistent with those of other air districts.

Using the District's prioritization procedures, facilities are placed into three categories: Category A for facilities that either volunteered or were 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.

Health Risk Assessments

A health risk assessment 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 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 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).

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 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. 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 5.

The District is currently prioritizing facilities based on most recent 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.

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 5: Health Risk Assessment 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	Escondido	364	< 0.1	1.2	N/a
1995	Campbell Marine (7)	San Diego	154	< 0.1	0.83	17
1994	Hues Metal Finishing	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)	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)	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)	Coronado	5.3	< 0.1	< 0.1	1.3
1993	Signet Armorlite (1)	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.	La Mesa	0.8	< 0.1	< 0.1	0

Table 5: Health Risk Assessment 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

(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 a 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.

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. This 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 6.

Table 6: 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 or proposed by other California air districts. The status of each facility subject to the public notification and risk reduction requirements of District Rule 1210 is summarized in Table 7.

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.

Following the adoption of Rule 1210 on June 12, 1996, the District published a preliminary determination of the eligibility of certain facilities with 1989 health risk assessments to base public notification requirements on updated 1993 HRA evaluations. Rule 1210 allowed these facilities to update their initial health risk assessments if the 1989 emission estimates had been permanently reduced or were no longer representative of actual releases. These updated evaluations were necessary to account for installed control equipment, material substitutions, improved manufacturing procedures, revised emission estimation techniques, refined emission factors, and modified toxic potencies. Taking

into consideration public and facility comments, a final determination of each facility's eligibility to base public notification requirements on updated health risk assessments was made in August 1996.

Eligible facilities were required to submit updated public health risk assessments to the District by February 7, 1997. The District approved all updated public health risk assessments by July 1997. 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 7. 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.

Public meetings, attended by the District, typically included a presentation by each facility and a discussion of the risk assessment results and what changes had been made or were planned to reduce public health risks. The USN Air Station North Island meeting provided information booths and videos. During and following the presentations, the public had the opportunity to ask questions. In each of the public meetings, a number of attendees remained concerned about the toxic air contaminant emissions and potential health risk levels. Representatives from each facility addressed concerns and answered questions. District representatives attending the public meetings received a variety of comments. Some attendees requested the District to provide more resources for monitoring and reducing emissions further and faster. Others complimented the District for its achievements in reducing toxic air contaminants emissions during the 1990s.

Of the second group of nine intermediate (Phase II) and Small (Phase III) facilities that were required to conduct HRAs, seven had risks above public notification levels. Five performed public notification. Two public notifications are currently pending. Three facilities (Flame Spray Inc., Palomar Plating, and Senior Flexonics, Ketema Division) have conducted public meetings based on public response to the notification.

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 carried out public notification, seven had estimated risks above the risk mitigation levels. These facilities are shown in Table 7 and have been requested to prepared risk reduction plans. Five of the plans have been approved by the District and are being or have been_implemented by the facilities. Submittal of risk reduction plans for an additional two facilities is pending.

Per Rule 1210, 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 the public notification level. Several facilities were required to repeat the public notification in 1999.

Table 7: Public Notification and Risk Reduction Status

HRA Evaluation Period	Facility		Max. Lifetime Cancer Risk per million (9)	Lifetime Cancer Burden (10)	Chronic THI (11)	Acute THI (12)
1989	General Dynamics / Pacific Hwy (7)	San Diego	1000	37	3.8	1.0
1995	Palomar Plating (4, 13, 5, 3)	Escondido	364	< 0.1	1.2	n/a
1995	Campbell Marine (4, 5, 7, 14)	San Diego	154	< 0.1	0.83	17
1994	Hues Metal Finishing (4, 13, 5)	San Marcos	85	< 0.1	0.66	12
1995	Escon Tool and Manuf,, Inc. (4, 13, 5, 3)	San Marcos	41	0.25	0.80	3.12
1995	Flame Spray Inc. (4, 13, 5, 3)	San Diego	40	< 0.1	0.14	30
1989	Powerine Oil Co. (7)	San Diego	32	< 0.1	0.10	0
1993	USN Air Station/North Island (1, 3)	Coronado	31	0.7	0.16	1.8
1993	USN Point Loma Naval Complex (1, 2)	San Diego	28	< 0.1	0.18	0.47
1993	National Steel & Shipbuilding (1, 2)	San Diego	27	< 0.1	0.3	3.5
1993	Chem-tronics, Inc. (1, 3, 5)	El Cajon	26	0.12	0.36	20
1993	USMC Miramar / USN Miramar (1, 2)	San Diego	24	0.2	0.13	0.81
1993	USN Navy Station, 32nd St. (1, 2)	San Diego	15	0.2	0.11	3
1993	Santa Fe Pacific Pipeline (1, 3, 6)	San Diego	8	< 0.1	< 0.1	< 0.1
1993	USN Amphibious Base (1, 5)	Coronado	5.3	< 0.1	< 0.1	1.3
1993	Signet Armorlite (8)	San Marcos	4.6	< 0.1	< 0.1	0.47
1994	Senior Flexonics, Ketema Aerospace and Electronics Division (4, 13, 5, 3)	El Cajon	4.5	< 0.1	< 0.1	4.24

(1) - This facility carried out a Public Notification pursuant to District Rule 1210 in 1997.
(2) - This facility carried out a Public Notification pursuant to District Rule 1210 in 1999.
(3) - This facility conducted a Public Meeting pursuant to District Rule 1210.
(4) - This facility has been required to submit Public Notification and Risk Reduction plans pursuant to District Rule 1210.
(5) - This facility is subject to the Risk Reduction requirements of District Rule 1210.
(6) - The 1993 Emissions Based Health Risk Assessment for this site was received 2/14/97. This facility carried out a Public Notification on 5/14/97 based on 1989 health risk assessment results.
(7) - This facility has ceased operations.
(8) - This facility carried out 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 health risk assessment.
(9) - 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.
(10) - 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 a million isopleth) as a result of exposure to emitted substances.
(11) - 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).
(12) - 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).
(13) - This facility carried out a Public Notification pursuant to District Rule 1210 in 2001.
(14) - Notification pending.

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, sensitive receptors, nearby terrain, and frequency of nuisance complaints.

In response to this audit recommendation, the risk assessment cancer thresholds will be reevaluated using the most recent Phase II/Phase III facility health risk assessment results. In addition, intermediate priority facilities are being reviewed to determine potential health risk assessment requirements. This is scheduled to be completed by the end of the third quarter of 2001.

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 is currently preparing the "Technical Support Document for Preparation of Health Risk Assessments" which will provide new guidance for preparing an air toxics risk assessments. The technical support document is still in draft form and will be issued upon completion of public comments and 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 will be testing a preliminary version of the software and reporting back to ARB on its findings. ARB plans to make a final version of the software available after approval of the "Technical Support Document for Preparation of Health Risk Assessments" in the second half of 2001.

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.

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.

QUALITY OF THE EMISSIONS INVENTORY DATA

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.

The District web site 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.

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 are 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 the emission 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 adopt and implement the state-approved emission reduction measures. ARB is currently developing Air Toxic Control Measures (ATCMs) to reduce emissions of diesel exhaust from mobile and stationary diesel engines and hexavalent chromium from automobile body painting operations.

In San Diego County, the Air Pollution Control Board has adopted statewide air toxics control measures (or is directly implementing 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 8. 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 8: 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, electric cars, and reducing vehicle miles traveled and vehicle trips will also serve to reduce air toxics emissions.

District rules requiring reductions in the emissions of smog-forming organic compounds from stationary sources also reduce emissions of some 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 2000, about 125 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. All sources had acute

and chronic noncancer total hazard indices less than one. Many of the applications 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.

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 190 in one million for Chula Vista and 220 in one million for El Cajon in 2000. This represents an overall reduction of 50 percent over the past decade.

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 in the Barrio Logan Area of San Diego from October 1999 to March 2000. 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.

The report of results and analysis of the monitoring, 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 "Reports." Results indicate that, for the monitoring period, ambient concentrations of toxic air contaminants in Barrio Logan are 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.

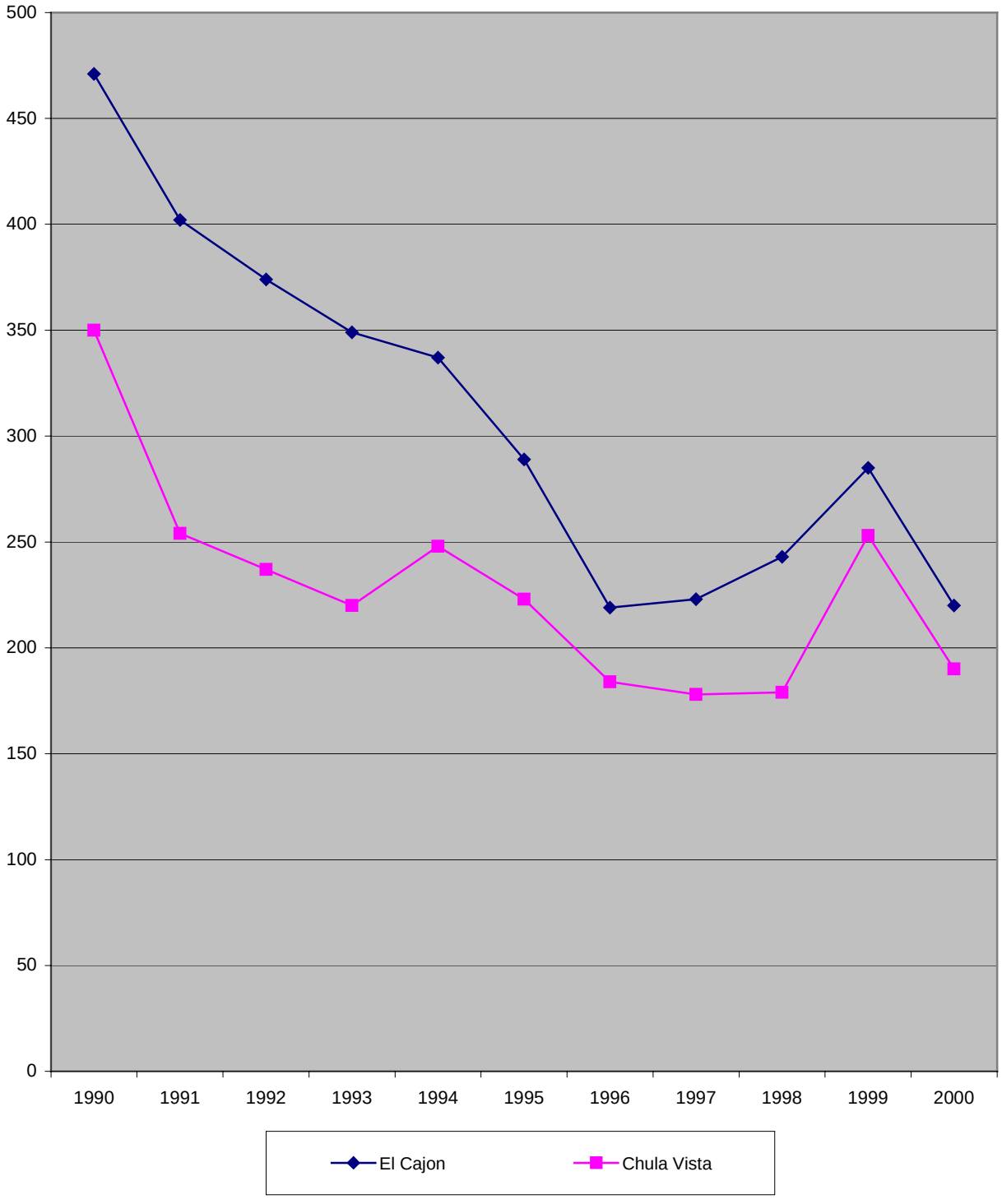
* Barrio Logan pollutant mean concentrations were more than one standard deviation lower than concentrations measured in Los Angeles for acetaldehyde, formaldehyde, benzene, 1,3-butadiene, carbon tetrachloride, methylene chloride, ortho-dichlorobenzene, para-dichlorobenzene, perchloroethylene, trichloroethylene,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

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, on average, in San Diego County. ARB estimates that risk from diesel particulate has decreased by about 50 percent in the past ten years.

Figure 1 – Toxic Air Contaminant Incremental Cancer Risk



CONCLUSIONS

Industrial, commercial, and governmental facilities emit large quantities of toxic air contaminants. Those sites inventoried to date emit more than four 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 historically have focused on criteria air pollutants (e.g., VOCs, oxides of nitrogen, particulate matter) rather than toxic air contaminants. Estimated emissions of toxic air contaminants from industrial sources have decreased by approximately eight and a half 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 with the goal of eliminating the use of these compounds by 2001. Federal and local programs also require best available control technology for many new and modified sources of toxic air contaminants. A summary of historical industrial source emission estimates for San Diego County over the past decade is provided in Table 4.

Over eight million pounds of industrial emission reductions have been quantified in San Diego County between Cycle 1 (1989 - 1991) and Cycle 3 (1997 - 1999). The most significant emission reductions since 1989 are listed below.

	Emission Reductions (lbs/year)
1,1,1-Trichloroethane:	2,699,157
Chlorofluorocarbons (CFCs)*	1,962,066
Methylene Chloride	1,213,957
Perchloroethylene	651,403
Other Compounds	642,093
Propylene Oxide	564,970
Isopropyl Alcohol	504,849
Silica, crystalline	463,421
Styrene	243,237
Methanol	193,799

*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 installing emission control equipment, material substitutions, and changes to a variety of manufacturing processes. Many solvent-intensive products and manufacturing operations have been modified to use acetone and hydrochlorofluorocarbons (HCFC's). These solvents are not listed 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. The most significant emission increases since 1989 are listed below.

	Emission Increases (lbs/year)
Acetone*	543,281
Methyl Tert Butyl Ether	330,417
Hydrochlorofluorocarbons (HCFC's)*	327,996
Formaldehyde	74,502
Methyl Ethyl Ketone	25,965
Ethyl Benzene	23,411
Hydrogen Chloride	20,438
Benzene	17,020
Methyl Isobutyl Ketone	12,567

* Acetone and hydrochlorofluorocarbons are neither listed toxic substances nor photochemically reactive.

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.

Ammonia, formaldehyde, hydrogen chloride, and benzene emission increases are associated with updated fuel combustion emission factors, installed NOx 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.

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.

Ongoing implementation of toxic air contaminant control programs such as the Air Toxics "Hot Spot" Program, District Rules 1200 (Toxic Air Contaminants - New Source Review) and 1210 (Toxic Air Contaminant Public Health Risks - Public Notification and Risk Reduction) will further 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.