

Using TRI Data to Demonstrate Silicon Valley's Legacy of High-Tech Pollution

by

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ABSTRACT

In August 1988, the Silicon Valley Toxics Coalition was the first group in the United States to compile and publicly release data from the new Toxics Release Inventory. The data — which documented millions of pounds of toxics released into the environment by the largest and most famous Silicon Valley electronics giants — were reported by the media throughout California and the United States. This coalition urged the self-described "clean industry" to drastically reduce its chemical use and emissions (particularly the CFC 113 discharges that proved to be the largest in the nation). Since then, and after other significant national media attention, the high-tech industry has significantly reduced its reliance on CFCs. In addition, the Santa Clara County Manufacturers Group — the local trade association for the Silicon Valley industry — began publishing an annual report in 1989 that documents its annual emissions as reported under TRI.

Production of synthetic chemicals in the United States, which became a significant industry in 1918, has expanded enormously since World War II. Figure 1 graphically depicts this escalation and highlights industrial usages of synthetic chemicals, including high-tech electronics.

Until rather recently, most people in the United States and throughout the world thought that the electronics industry was not part of the toxics release problem — that it was, as self-described, a "clean" industry. However, over the past decade we have learned that the "clean" industry was in fact highly polluting. More Superfund sites are located in California's Silicon Valley — a hotbed of high-tech industry — than anywhere else in the United States. (Superfund sites are so polluted that the U.S. Environmental Protection Agency (EPA) has put them on a priority list for cleanup.) Groundwater pollution at 29 of these sites directly stems from the use and misuse of solvents used in high-tech industry.

In addition, a high incidence of air pollution and ozone depletion from these industries as well

as occupational health hazards have been noted. Occupation-caused disease among semiconductor workers is about three times that of the national manufacturing average.

Introducing Right-to-Know in Silicon Valley

In response to this situation, the Silicon Valley Toxics Coalition produced a booklet, *The Legacy of High-Tech Development: The Toxic Life Cycle of Computer Manufacturing*, which states that the industry presents some significant problems. We were able to determine this through the development of the right-to-know movement in the United States, of which the Toxics Release Inventory (TRI) is but one aspect.

You might think that right-to-know legislation was introduced without difficulty. In fact, it has a rich history of struggle in the United States dating back to the 1970s when, coming out of the labor movement, the concept of worker right-to-know was introduced in the first attempt to pry

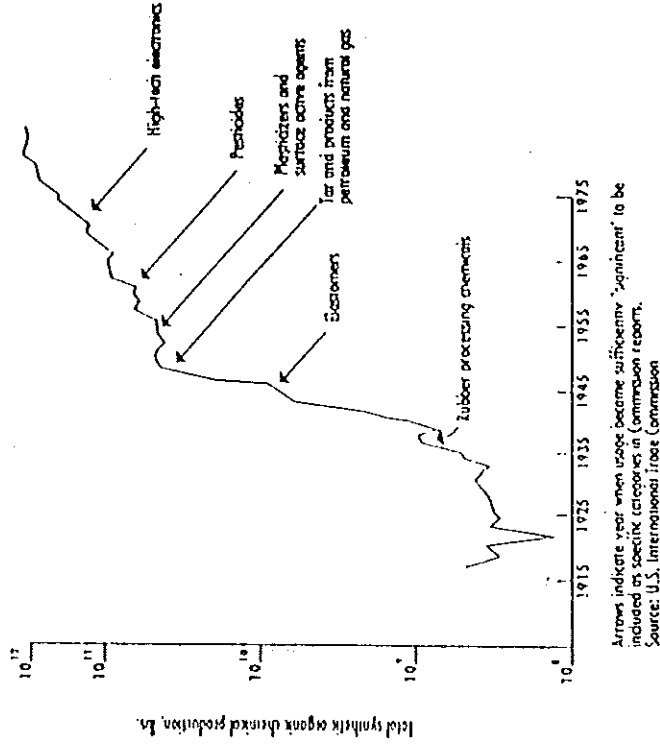


Figure 1.—Production of synthetic organic chemicals in the United States from 1918 to 1976. Arrows indicate year when usage became sufficiently significant to be included as specific categories in Commission reports. Source: U.S. International Trade Commission, 1978.

loose toxicity and chemical information and organize to combat industrial diseases.

This difficult, laborious process took place in many different industries. Mining is one of the main examples, with its high incidence of black lung disease. The community right-to-know movement started at the local level in the early 1980s when communities began developing and passing right-to-know ordinances.

The Silicon Valley Toxics Coalition was one of the first groups to pass a right-to-know ordinance, back in 1983. We had to overcome significant resistance from industry and government, who were uncomfortable with the notion of making this kind of information public for a variety of reasons, including concerns about proprietary or trade secrets. (Industries also cited additional paperwork as a possible problem.)

When we started organizing for right-to-know ordinances in the Silicon Valley, some communities and industries drafted a proposal that requires companies to report toxics information to the local government but made it a crime to distribute that information to the public. We had to organize to overcome that type of approach and eventually ended up with a local right-to-know

ordinance in 1983 that became California law in 1985. Subsequently, the federal government picked up the idea.

Our history with federal right-to-know dates back to 1988, when the Coalition compiled and released data to dramatize some of the hazards associated with high-tech production technology to the Silicon Valley and communities across the country. This was long before EPA had compiled the data — or anybody else for that matter. We didn't have access to a computer system; we got a box-load of paper from our state agency and sat down one weekend and typed information into a personal computer using a database program. This information showed beyond a doubt that millions of pounds of toxics were being released, discharged, and transported off-site from a relatively small number of companies.

Initially, we compiled a list of 25 companies. When we surveyed the top 12 companies in Silicon Valley, we found they were releasing millions of pounds of toxics, data that we put in a report and gave to the media (Table 1). Because this shocking information was being reported for the first time, it received quite a bit of attention. Some of the following information was presented:

"Twenty-five major area companies are dumping millions of pounds of toxic chemicals into the environment each year according to data recently filed with EPA and the California Office of Emergency Services. This new information, required pursuant to Title III of the Superfund Amendments of 1986, is now publicly available as of July 1, 1988. The composite data for Silicon Valley reveals that 25 companies with 41 facilities in Santa Clara County admitted discharging over 12 million pounds of 34 different toxic chemicals into air, land, and water. Almost 2 million pounds went to the air through stack emissions, another 2 million pounds were classified as fugitive emissions, and about 8 million pounds were discharged into sewage treatment plants or otherwise disposed of.

"Under the current legal regulations, this type of pollution is largely legal although considered immoral by many. The Silicon Valley Toxics Coalition has charged that industry has enjoyed a free ride to use the air as an

open sewer for its waste disposal and has issued a call for industry to implement toxics use reduction and source reduction measures to cut down on their use and disposal of these chemicals.

"Some companies are already beginning to respond to community pressures in other parts of the country. Monsanto, for instance, has acknowledged almost 18 million pounds of discharges nationwide but has promised to reduce those emissions by 90 percent in four years and is approaching a zero discharge or zero tolerance stance."

Table 1.—The TRI "Dirty Dozen" for Silicon Valley for 1987-88 reporting years.

NAME	1987 + 1988 TOTAL RELEASES (lbs)
IBM	2,798,000
Xidex	2,237,000
UTC	1,955,000
National Semi	1,630,000
South Bay Circuits	1,477,000
Hewlett Packard	1,214,000
Lockheed	1,198,000
Siliconix	1,140,000
LSI Logic	996,000
Del Monte	781,000
Advanced Circuit Tech.	778,000
FMC	609,000

Source: Title 22-TRI Data

We also publicized our letter to IBM, urging it to follow Monsanto's example — to disclose their yearly emissions of freon worldwide and pledge prompt phaseout of these ozone-depleting chemicals. IBM's San Jose plant listed more than 1.3 million pounds of ozone released into the atmosphere, which turned out to be the largest single source that we have uncovered. This material can be found in our booklet, *The Citizen's Guide to the New Federal Right-to-Know*.

Next, we compiled two years' worth of data on combined releases, showing that companies that had been deemed largely "clean" were in reality releasing millions of pounds of pollutants into the environment.

An interesting sidelight concerns a company called Advanced Micro Devices. When we published our initial list, this company's releases — over 2 million pounds in the first reported year — placed them at the top of our list. The company

took great offense at this and, to restore its credibility, placed a full-page newspaper ad to accuse the Coalition of deliberately distorting and misstating the information. Fortunately, EPA also saw this ad and looked into its records, where it discovered that we had simply published EPA data. The Agency then wrote a letter to that effect, which helped set the record straight. Advanced Micro Devices later filed amended reports with release data that removed it from the "Dirty Dozen" list.

Using Right-to-Know Information

The Coalition used right-to-know information not only to publicize and dramatize the problems but to put out some challenges to local industry and, in particular, to companies that were discharging the largest amounts of chlorofluorocarbons (CFCs) — the largest source of the discharges into the atmosphere.

Table 2 is a compilation of the 1987 data, by chemical, on the companies in Silicon Valley. We took this information — particularly the IBM data — and, on Earth Day 1989, organized a large rally with other groups in front of IBM's plant gates and invited Ralph Nader, a well-known environmental and consumer advocate in the United States, to speak. We challenged IBM to adopt aggressive goals and timetables to completely eliminate CFCs.

At the time, IBM didn't have much to say; it was not ready to set phaseout goals and timetables. However, IBM reported to the media that it would comply with the Montreal Protocols — the international treaty to phase out CFCs — which would take effect in the year 2000. The Coalition replied that, because of the huge volume IBM was discharging, it should set an example and take much more aggressive action.

By Earthday 1990, IBM had come up with a new program. It committed to an aggressive phaseout of CFCs, not only in San Jose but worldwide, with a phaseout date of 1993, which at that point was the most rapid of any of the major electronic companies in the world. IBM also invited the Coalition and other groups to tour its Silicon Valley plant and view a new process that ultracleaned disk drives without using CFCs, just soap and water, a fairly low-tech solution to an enormous environmental concern. Now, IBM is rapidly phasing out the use of that class of chemicals.

Table 2.—1987 data on chemical emissions from Silicon Valley Industries.

CHEMICAL NAME	FUGITIVE EMISSIONS (lbs/yr)	STACK EMISSIONS (lbs/yr)	TOTAL AIR EMISSIONS	OTHER	
				DISCHARGES & OFF-SITE DISPOSAL ¹	TOTAL
Freon	1,448,299	376,710	1,825,009	20,142	1,845,151
TCA	316,212	440,132	756,344	191,452	947,796
Hydrogen chloride	0	274,065	274,065	0	274,065
Acetone	100,675	94,745	195,420	196,577	391,997
Methylene chloride	73,220	110,010	183,230	13,642	196,872
MEK	31,489	64,713	96,202	54,939	151,141
Xylene	15,055	42,566	57,621	111,872	169,493
Styrene	27,000	3,600	30,600	0	30,600
Tetrachloroethylene	29,800	0	29,800	0	29,800
Sulfuric acid	0	28,888	28,888	274,074	302,962
Methanol	8,500	6,200	14,700	52,600	67,300
Sodium sulfate	0	9,283	9,283	2,969,326	2,978,609
Phosphoric acid	102	7,677	7,779	86,226	94,005
Sodium hydroxide	0	6,577	6,577	425,060	432,437
Hydrogen fluoride	0	6,300	6,300	61,849	68,149
Glycol ethers	0	4,776	4,776	76,030	80,806
Phenol	0	3,900	3,900	11,600	15,500
Aluminum oxide	0	0	0	395,381	395,381
Nitric acid	0	0	0	84,961	84,961
Copper & compounds	0	0	0	73,714	73,714
Hydrochloric acid	0	0	0	53,500	53,500
Ethylene glycol	0	0	0	43,125	43,125
TOTAL²	2,062,277	1,975,994	4,038,271	4,926,804	8,965,075

¹ Including discharge to sewage treatment plants² Total includes category "others"

We surveyed the 25 largest CFC dischargers in northern California, asking them for goals and timetables for complete phaseout of CFC production processes. We then published a list of companies that had set aggressive goals and timetables and those that hadn't and called them "leaders and laggards." Laggards were largely defense and aerospace contractors who were hindered by military specifications that required using CFCs. Military standards continue to be a big problem in the United States. The Coalition is trying to help speed up the process whereby the military will revise those specifications.

After we generated a number of reports that focused on emissions and called for reductions, the Santa Clara County Manufacturing Group, a trade association that represents most of the electronic manufacturing companies in our area, decided to start compiling this information and putting their own spin on it to publicize emission reductions. For the last couple of years, it has been publishing a report that identifies specific reductions by chemical and plant.

We've come a long way — from the initial resistance and hostility to the point where industry is putting out emission reports. In some cases, some of these reductions can be as simple as housekeeping — putting lids on solvent tanks or educating employees about handling solvents — and process changes that can be accomplished with relative ease. Of course, in some significant areas, solutions will not include short-term, easy fixes but substantial research and development to find safer production processes that use clean technologies.

Another Coalition effort involves the Campaign for Responsible Technology, started by labor, environmental, and local public interest groups, and computer professionals all around the country who are focusing on problems at SEMATECH, the research consortium based in Austin, Texas. We are asking this consortium of the 14 largest semiconductor companies to develop safer production technologies in partnership with the federal government because we realize that individual companies cannot do this

kind of research economically. The progress being made at the consortium is impressive, not only in terms of CFC reductions but also in ways to move away from using toxic gases in semiconductor processing.

Conclusions

The TRI has been useful in dramatizing toxic emissions and encouraging reductions. However, pollutants don't respect boundaries. Multinational and transnational companies also want uniform reporting. With standard regulations and requirements, companies are less likely to play different jurisdictions off against each other.

This approach to reductions is often largely voluntary and nonregulatory. Although 85,000 companies report, EPA does not have 85,000 inspectors to verify the data, so enforcement is pretty spotty. That's where some of the non-governmental organizations come into play — to enforce compliance through citizen action.

The Silicon Valley Toxics Coalition, as well as a number of other U.S. groups, has been trying to negotiate good neighbor agreements with companies that are major polluters in our neighborhoods to get them to meet goals in reductions and also allow citizen inspection.

Lastly, it is important to make the distinction between waste reduction and decreasing toxics use. Increasingly, the United States and some countries in Europe are looking at the product itself — distinguishing between waste and toxic chemical production and use. Many of the chemical companies are making great progress in reducing waste, but often the product they make is toxic.

Our focus on the electronics industry has been to help it wean itself away from toxic products. That's why IBM's switch from CFCs to nontoxic soap and water is such an important example.

If we can begin to round off the tremendous increase in the production of synthetic organic chemicals, we will see the light at the end of the tunnel.

This paper was presented at the International Conference on Reporting Releases of Toxic Chemicals in Vienna, Austria on November 14, 1991. The conference was sponsored by the U.S. Environmental Protection Agency and the Organization for Economic Cooperation and Development.

"We have abdicated power over our future to the experts. And, for the sake of our children, we must take that power back. Our society does not even have a forum to discuss the possible results of technological change....by failing to establish such a mechanism—a body chosen directly or indirectly by the people—we have placed the fate of the planet in the hands of the technical specialists who, however brilliant, are unqualified to decide questions of the common good."

Richard Goodwin. Former advisor to President's Kennedy and Johnson.

