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# GLOBAL ELECTRONICS

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## CAMPAIGN SEEKS SEMATECH TOXICS USE REDUCTION RESEARCH

Representatives of environmental organizations, labor officials, and others from across the United States will meet June 4 with top officials of Sematech, the Defense Department-supported semiconductor manufacturing technology consortium. The delegation, convened by the newly formed Campaign for Responsible Technology (CRT), will ask Sematech to give a high priority to the development of chip-manufacturing techniques that use less—that is, fewer, smaller volumes of, and less dangerous—hazardous materials.

CRT's goal, in addition to reducing the environmental and occupational health risks of high-tech production, is to shift the national debate over high-tech industrial policy. Government-backed programs, it feels, should go beyond corporate subsidies or figuring out ways to "beat Japan," but should serve the broader interests of the American people. CRT wants government subsidies for industrial programs to be channeled through agencies more responsible than the Pentagon to CRT's constituencies.

CRT's entry into the debate comes at a watershed in the development of an American high-tech industrial policy. Leaders of the electronics industry are moving beyond pooled research; through Sematech, they are actively attempting to influence the structure of the semiconductor equipment industry. Meanwhile, their ideological opponents within the Bush administration are attempting to short-circuit their efforts. High-level opponents of a proactive industrial policy succeeded in having Craig Fields, an industry ally, transferred from his position as head of the Defense Advanced Research Projects Agency (DARPA), but his firing triggered new posturing by high-tech's friends in government.

In Austin, CRT will call upon Sematech to take the following six steps. If Sematech decides to cooperate, then the organizations and constituencies that make up CRT can be expected not only to back Sematech in the ongoing industrial policy debate, but even to support additional Sematech funding to implement the CRT program. CRT proposes that Sematech:

- 1) Develop new technologies and processes that will be less dependent on toxic chemicals.
- 2) Introduce new health and safety procedures for microelectronics workers.
- 3) Inform Sematech member companies about the health and community hazards of chip production, as well as appropriate solutions.
- 4) Ensure that scientists, engineers, and other Sematech staff are trained in toxic use reduction.
- 5) Create an advisory board composed of labor, environmental, and health professionals to oversee Sematech's environmental/occupational health programs.
- 6) Move toward a funding base less dependent on the Pentagon.

As regular **Global Electronics** readers know, the fabrication of semiconductor wafers requires a large number and variety of hazardous materials. Toxic chemicals and metals are built into each chip, and other hazardous chemicals are used in processing. Workers exposed to such hazards

*(continued on page 2)*

## WHATEVER HAPPENED TO MARCH AND APRIL?

Once again, we have fallen behind schedule. PSC's normally poor financial situation has been unusually desperate this year, so we have had neither the time or money to maintain our publication schedule. We are sorry!

Though we have not published **Global Electronics** in March or April, we have not skipped any issue numbers. Each subscription, therefore, is automatically extended two months.

If you consider PSC's services or resources valuable, and you know someone rich, have him or her send us a check. If you or a friend live in Silicon Valley, please consider volunteering to help overcome our filing backlog.

suffer a high rate of systemic illness and, according to at least one major study, an elevated risk of obstetric problems. Furthermore, chipmaking facilities have poisoned the groundwater and threaten other forms of environmental degradation at numerous locations.

Sematech currently plans to develop techniques for making major incremental advances in chip production. By 1993, it hopes to devise methods of etching .35 micron features onto silicon wafers, allowing an enormous increase in the number of functions that can be squeezed onto each chip.

Such advancement could make the industry even more reliant upon toxic processing chemicals, used to remove dust contamination and other imperfections. On the other hand, Sematech could develop and disseminate entire new production methods, such as directly "writing" circuits using electron beams. (At this time, however, Sematech planners consider E-beams useful only for making photolithographic masks.)

Although the semiconductor industry has done a few things to minimize the use of hazardous materials, no single merchant producer has the resources to experiment with wholly new production methods. Furthermore, finding ways to reduce chemical use requires cooperation between semiconductor equipment firms, which have the expertise, and device producers, who end up footing the bill for pollution or pollution control.

Sematech, by combining the efforts of numerous major chipmakers, equipment producers, universities, and the government, could be the vehicle to reduce toxics use. In fact, Sematech may be better suited for devising environmentally sound ways to build chips than to promote U.S. competition with Japan, since there is no guarantee that Japanese companies won't absorb Sematech findings from their American suppliers, partners, and customers.

Currently, however, Sematech is embroiled in a dispute over the proper role of the Federal government in the promotion of the semiconductor industry. Last year Congress authorized an experimental program, in which DARPA could make \$25 million in investments in small high-tech firms over a two-year period. In April, DARPA invested in a high-tech firm for the first time, placing \$4 million in Gazelle Semiconductor, a Silicon Valley firm specializing in gallium arsenide technology. This seemed to signify an acceptance of Japanese-style industrial policy, called "picking winners and losers" by its American detractors.

Within a week, DARPA director Fields had been transferred. Most reports suggest that he was axed at the behest of a White House faction led by

Chief of Staff John Sununu, Economic Adviser Michael Boskin, and OMB (Office of Management and Budget) head Richard Darman. This powerful triumvirate opposes "picking winners and losers," and they may have targeted Fields to discourage future industrial "venturism." (Boskin is an old buddy of politician/entrepreneur Ed Zschau, but it is unclear whether Zschau now stands with his ideological allies or with his compatriots in industry.)

But Fields' firing may have sparked, not resolved, the conflict. Not only did industry criticize the move, but influential members of Congress from both parties quickly issued letters attacking the move. By diminishing DARPA's role in industrial policy, the White House team may strengthen support for proposals to fund a civilian ARPA in the Commerce Department.

Meanwhile, Sematech and the real power in American high-tech, IBM, are making strategic moves. Most notably, they orchestrated the majority takeover of Perkin-Elmer's semiconductor equipment business by the Silicon Valley Group. Sematech and IBM have agreed to support research by the new joint venture. In addition, Sematech is threatening to withdraw a development contract from Semi-Gas Systems, the leading supplier of gas containment systems (for chip processing) if its parent company, Hercules Corp. goes through with plans to sell the Silicon Valley firms to Japan's Nippon-Sanso. (San Jose Mercury News, April 19, 1990)

Even without the wholehearted support of the Federal government, electronics industry leaders seem headed irreversibly down the Japanese path. For years entrenched in an industrial structure that

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makes it difficult to compete internationally, they are using not only their own resources, but the Federal subsidies for Sematech, to fabricate a new set of relationships.

When CRT representatives go to Austin, they won't oppose Sematech's industrial strategy in principle. Rather, they will argue for a broader industrial policy, serving the workers and neighbors, not just the owners and top managers, of American chip manufacturers.

## PROTECTING THE OZONE

The electronics industry is a major source of ozone-depleting emissions of chlorofluorocarbons, or CFC's, primarily CFC-113, which is used as a solvent to clean printed circuit boards and disk drives. In fact, the industry began using CFC's after their environmental risks were widely known.

Facing the eventual, if not rapid phase-out of CFC's, major American computer-producers now are "pioneering" alternative cleaning methods, showing that high-tech minds can develop source reduction technologies. But, in the absence of serious pressure, they are not yet seeking ways to plate circuit boards without hazardous heavy metals, nor are they developing substitutes for 1,1,1, trichloroethane (TCA), a toxic solvent which because of the magnitude of its current use also poses a serious threat to the ozone layer.

Journalist Dennis Hayes reports that the electronics industry adopted CFC-based cleaning techniques after the aerosol industry stopped using the chemicals (*Mother Jones*, December, 1989). Hayes charges that the industry ignored scientific evidence arguing that CFC emissions deplete the ozone layer that protects the planet's denizens against the Sun's ultraviolet rays.

Electronics spokesmen, however, say that the evidence was not clear at the time, and that CFC-113 was safer than toxic chemicals such as trichloroethylene (TCE), a probable carcinogen that most firms phased out about that time. Hayes says that the industry abandoned cleaning technologies that used water and detergents, but those would have required upgrading to deal with the additional requirements posed by the ongoing miniaturization of electronic circuits.

Faced with a diminishing supply, increasing regulation, and bad publicity, computer companies are now leading the way toward the replacement of CFC-113 with water-based cleaning methods. IBM's San Jose plant, which has announced a disk-drive-component cleaning method that uses ultrasound and water, reduced its reported CFC-113 releases from 1.5 million pounds in 1987 to

237,000 pounds in 1989. Digital Equipment has developed a method of cleaning circuit boards with a fine spray of water, detergent, and hot air.

At the same time, IBM has increased its emissions of TCA, also known as methyl chloroform, nearly tripling its TCA emissions from San Jose last year. TCA is toxic; it may cause birth defects; and by the time studies are completed, it may even be considered a carcinogen. By weight, TCA depletes the ozone-layer one eighth as fast as CFC-113 under normal circumstances. However, in 1987, California manufacturers released about four times as much TCA as CFC-113.

Despite the toxic hazards and ozone-depleting risks of TCA, it hasn't caught on in the media like CFC's. No one is proposing that it be banned, let alone that its use be reduced. Little work is being done to develop or test substitutes.

While CRT challenges Sematech to limit toxics use in chip production, the same approach must be applied to the chemicals used in the other major forms of electronics productions. Clean circuits should require a dirty environment.

Industry also needs methods of fabricating printed circuit boards without releasing heavy metals into sewage waste stream and requiring the offsite disposal of large volumes of toxic sludge. Immediately, this probably means in-line recycling systems, in which metals such as cadmium, lead, or nickel are removed from wastewater through distillation. Then both the water and metals can be reused. In the long run safer, substitute conductors must be developed.

## WATER

In the early 1970's, Silicon Valley electronics companies acquired huge quantities of water from public supplies. During the drought of 1976, however, leading firms installed major water-reclamation systems and instituted preemptive maintenance measures. Water use went way down, but it has risen since as a result of industry expansion, requirements for cleaner circuits, substitution of water for organic solvents, and the implementation of air emission controls—some equipment uses water to scrub the air.

This year, as northern California enters its third year of drought, the Santa Clara Valley Water district, which serves the southern half of Silicon Valley, has been forced to cut back its water consumption by 25%. Though some chip producers have virtually eliminated the watering of landscaping, they "cannot" meet that level without laying off workers. The Water District expects firms to cut back by about 10 percent.

## PICO KOREA WORKERS PURSUE RUNAWAY MANAGEMENT

Korean workers, long considered docile but busy little bees by the foreign press and investors, have brought their case to the United States. In April, three leaders of the Korea Pico Union, whose plant was abandoned by their U.S. employer in early 1989, met with the company Board Chairman in New York City. Unable to win concessions, they led a demonstration at the Pico Products headquarters in Liverpool, New York.

In February, 1989, the Korean subsidiary of Pico Products, a manufacturer of cable television system components, abruptly halted operations at its Seoul plant. Executives fled the country, hiring a law firm to pay off local managers, but still owing suppliers bills totalling US\$600,000, \$176,000 in taxes, plus a month's back pay and legally required severance benefits for 300 workers.

The workers, primarily middle-age married women, had formed their union in June, 1988. In November of that year, Pico management signed a contract that covered hours, conditions, overtime pay, and collective bargaining rules. "Wages were to be negotiated subject to the terms of the contract. When workers attempted in January and February, 1989 to negotiate wage increases, the management disappeared in the middle of contract talks."

Wages were substandard, even for Korea. At the time of the contract talks, starting Pico workers received 4,100 Won (about US\$6) per day, six days a week. In January, 1989, when the South Korean government instituted a minimum wage, it set the daily legal minimum at 4,800 Won.

(Working conditions were unhealthy, as well, with workers forced to breathe lead smoke.)

When company officials fled, the workers (at least 140 of them) occupied the plant and demanded their pay. Pico refused to meet with them, and instead secretly found a Korean subcontractor, Tongkwang Electronics, to supply the same products. Though the Korean government issued an arrest warrant for Pico chief executive Bernard Hitchcock, it made no attempt to halt the alternate shipments.

Workers decided to take their demands to the U.S., and thousands of Korean workers contributed funds to pay the air fares of three Pico Union members. Hundreds of supporters attended a send-off rally.

Forty members of the U.S. Congress sent a letter urging Hitchcock to talk with the delegation. Though for more than a year he had refused to meet with a U.S. attorney representing the workers, Hitchcock met with the threesome. Despite the meeting, he offered nothing.

The following week, the workers led a demonstration at corporate headquarters, upstate in Liverpool, and then they embarked upon a national speaking tour.

Their American supporters, organized by the North American Coalition for Human Rights in Korea, have formed the Pico Worker's Support Committee. The Committee is asking American Cable TV subscribers to contact their local cable companies to ask them to stop doing business with Pico.

For more information, contact the Pico Workers Support Committee, c/o NACHRK, 110 Maryland Ave., NE, Washington, DC, 20002.



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