

Sematech could offer antidote to high-tech toxics

By Lenny Siegel

THE untimely loss of Robert Noyce, semiconductor pioneer and leader of Sematech, the Semiconductor Manufacturing Technology consortium, provides a time to reflect on national high-tech industrial policy. Largely through his stature, Noyce was able to breathe life into the joint venture of 14 top U.S.-owned chip and computer firms, which are aided by a \$100 million per year subsidy from the Department of Defense.

Finding Noyce's replacement is a critical decision which will determine whether, and in what form, Sematech survives.

Sematech might, as it promises in its official documents, focus on developing techniques for writing smaller and smaller features on a flake of silicon, thus creating faster and more powerful chips. But now that the enterprise has established its momentum, it is developing a more strategic point of view. It is marshaling the resources of its member companies, as well as taxpayer subsidy, to restructure the industry that supplies production equipment and materials to American chip makers. It is financing selected suppliers to build a "U.S. team" to take on "Japan Inc."

There is nothing new about teamwork among high-tech companies and the Defense Department. And unlike George Bush's key economic advisers, I see nothing wrong with such an approach to industrial policy. But it is doubtful that Sematech will do much to bolster the international competitiveness of U.S.-owned firms.

Most, if not all, of Sematech's member companies are enmeshed in a complex web of strategic alliances, ranging from technology licensing agreements to joint investments, with their counterparts in Japan and Europe. It is unlikely that new ideas generated at Sematech will remain solely in U.S. hands for long.

Furthermore, the equipment producers and specialized material suppliers that Sematech sponsors are not likely to stop shipping to Japanese-owned companies, which comprise the largest single market for their output.

However, Sematech, as a government-subsidized joint venture, is ideally situated to further another important goal: figuring out how to make chips without threatening the environment or endangering production workers.

Ever since Silicon Valley officials discovered, nearly a decade ago, that the industry leaked toxic chemicals like a sieve into area groundwater, chip makers have been struggling with massive cleanup operations while trying to limit

Still, semiconductor companies continue to use a wide range of extremely hazardous materials in production, and despite their massive investments in research and development, they have done little to prevent pollution at its source. Developing new, safer ways to fabricate chips could pay off for the industry in the long run, but most manufacturers do not have the resources to risk on new production methods.

Furthermore, equipment firms, not chip producers, usually take the leading role in devising new production technologies. Since they are not held accountable for the pollution of their customers (the chip makers), they have little interest in pollution prevention.

Sematech, as a joint venture, overcomes the (horizontal) isolation of participating firms. Through its work with equipment suppliers, it bridges the (vertical) gap between process innovators and end users. And as a government-sponsored agency, it can be held responsible by the public.

The weekend that Bob Noyce died, 50 representatives of environmental, health and safety, and worker groups from high-tech centers around the nation gathered in Austin, Texas, to call on Sematech to promote toxics use reduction. The Campaign for Responsible Technology (CRT) was scheduled to meet with Sematech officials on June 4, but Noyce's death has delayed the discussion.

Still, before CRT activists returned home, they fashioned the elements of a program that they hope will eventually apply to Sematech and to all instruments of U.S. high-tech industrial policy.

First, they proposed that Sematech devote at least 10 percent of its budget to developing technologies designed to reduce the use of hazardous materials in chip production. Such research should review the use of process chemicals (such as solvents and photo-resists) and materials that are an integral part of chip products (including dopants, such as arsine). And it should consider wholly new methods of lithography that require fewer chemicals at the outset.

Second, they proposed that Sematech regularly assess the environmental and economic impact of all its programs. Will new geometries or new machines increase the requirement for hazardous materials? Can alternative approaches limit the risks? They also proposed that Sematech evaluate the impact of its technologies on the people who work in semiconductor production.

Third, they called for the establishment of an advisory board, including environmental and labor representatives, to oversee the above programs.

And finally, to make it easier to tailor Sematech's work program to civilian national goals, CRT proposed that Sematech be moved from the Pentagon to a civilian agency.

To CRT participants, having to wait for Sematech to reorganize is indeed disappointing. But their own meeting was a breakthrough. Environmental and labor groups that originally formed to react to problems caused by industry are now working to shape industry. Protecting workers and the environment may prove to be a much more realistic goal than "beating Japan." And it should form the heart of any sensible U.S. industrial policy.

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