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ELECTRONIC ENGINEERING TIMES
SECTION 3

DEC Study Raises Questions: How Safe Are Clean Rooms?

By Joan Stapleton

The recently completed Digital Equipment Corp. study on the health of semiconductor production workers has stirred up the entire industry, and has spurred strong disagreement among chip makers and local health and safety groups.

The yet-unpublished study found a significantly high miscarriage rate for women employed on the company's semiconductor production lines (see *EE Times*, Jan. 19, Page 4). The findings resurrected a host of unanswered questions about the health and safety of workers in an industry that prides itself as being one of the safest in manufacturing.

The study, concluded last fall, was sponsored by Digital and conducted by University of Massachusetts researchers.

The most notable reaction to early reports of the study came from one of the largest semiconductor manufacturers—AT&T. On Jan. 13, the company advised 15 pregnant workers to move out of the fabrication areas or AT&T would "laterally transfer them out."

Other chip manufacturers chose not to follow AT&T's lead. Many said they informed their clean room workers what was known of the study results. But the companies stopped short of forcing pregnant women off production lines.

Several of the Silicon Valley companies say they are looking closely at the study's ramifications. Others have adopted a wait-and-see attitude, pending publication of the complete study findings.

Meanwhile, local health and safety groups are up in arms over the matter, and have criticized what they view as an industry long on rhetoric and short on action.

Blames Industry

"There has never been a study because industry doesn't want to know what's really going on with the health of its workers," charged Meta Mendel-Reyes, director of the Santa Clara Center on Occupational Safety and Health (SCOSH). "The employers are not interested in finding out health problems that might require them to spend some money on making sure the workplaces are safe and healthy."

Mendel-Reyes describes the 8-year-old organization as "a coalition of labor, unorganized workers and community activists to clean up the so-called clean' industry." SCOSH claims 200 active members, and a support list of about 1,000.

"At any one time in our area, there are 50 cases pending of workers appealing to workers compensation because of a chemical injury," added Mendel-Reyes. "So we think it's a huge problem."

Ted Smith agrees.

Smith is the director of the Silicon Valley Toxics Coalition—another nonprofit community organization. The coalition mainly focuses on environmental contamination, but the organization also probes workplace health problems.

The Digital Equipment study, said Smith, "is further evidence of our fears that what is going on inside these clean rooms is of tremendous potential impact on the health of the workers." According to Smith, clean-room employee health complaints range from skin rashes to internal-organ malfunctions.

"There are doctors who are increasingly concerned about the potential for broad-scale immune systems damage," added Smith. "That's quite a controversial notion in the medical community."

The Silicon Valley Toxics Coalition, SCOSH and other community organizations recently met and developed a three-point platform:

- A ban on glycol ethers—solvents commonly used in semiconductor production. A federal Occupational Safety and Health Administration (OSHA) "hazard alert" warned the glycol ethers were found to cause reproductive problems in both female and male laboratory animals.
- That policies focus on removing toxic chemicals rather than on one segment of the work force (e.g., pregnant workers).
- There should be an independently funded, long-term industrywide study of the health effects on semiconductor workers.

Since the Digital study appears to be the first to examine the health of semiconductor workers, SCOSH and others complain they have been forced largely to depend on employee reports of health problems for evidence.

"We don't like going on horror stories that workers tell us any more than anybody else does," said Mendel-Reyes. "But there has been no money to do these kinds of studies because the industry has clamped down."

Several semiconductor manufacturers agree a more expansive study is needed. But a spokesman from Advanced Micro Devices slammed groups such as the Silicon Valley Toxics Coalition and SCOSH, and said the company would have nothing to do with them.

Strikes Out At Local Groups

"We favor a more expansive study, and AMD has been one of the first to call for such a study," said John Greenagel, AMD's public relations manager. But he added, "We are not going to put such a study in the hands of a group like the Silicon Valley Toxics Coalition or its allied organizations."

"I would also say that if their agenda were adhered to we would not have a semiconductor group," Greenagel said. "The idea of removing all these chemicals from the workplace means that you are not going to make integrated circuits, because they cannot be made without the use of chemicals."

The AMD spokesman suggested a cooperative industry effort in a "science-based study."

"That is not going to come about from anything that would be connected with the Silicon Valley Toxics Coalition," Greenagel continued. "Their record on science is abysmal."

A long-term study may not be far off.

Two weeks ago, a 12-person Semiconductor Industry Association (SIA) team met with the University of Massachusetts researchers to examine the study. "We will be preparing a report which would have recommendations and options for our occupational health committee meeting on Feb. 19," said Steve Pedersen, director of environmental and OSHA affairs for the SIA. He added that he suspects the "long-term study issue" will be addressed in that report.

As far as the issue of removing toxic chemicals from clean rooms rather than removing workers there, several companies said they've done their best to avoid the use of toxic substances. "Wherever we can, we will use chemicals that are less toxic and more benign," said AMD's Greenagel. The AMD spokesman also pointed out that when trichloroethylene (TCE)—a solvent commonly used in clean rooms—was listed as a suspected carcinogen, most manufacturers switched to trichloroethane (TCA)—which was considered far less toxic.

"We've always tried to move more in that direction," said John Ormsby, an Intel spokesman.

AT&T's Choice

So why was AT&T the only chip manufacturer to pluck its pregnant workers from the fab areas?

AT&T spokesperson Lydia Whitefield maintains the move is an "interim policy" until other issues can be resolved. "The DEC study doesn't implicate one area yet," she said. "But if it becomes a problem with toxic chemicals we are certainly going to be looking at how we can continue to manufacture chips without injuring our employees in any way."

Others, including SCOSH's Mendel-Reyes and the Toxics Coalition's Smith, suspect the AT&T decision had a lot to do with the fact it is one of the few semiconductor manufacturers with unionized workers. But in an earlier interview, the company denied unionization played a role.

"While we informed the union of the action taken, the first, foremost and overriding reason for the decision was the health and safety of our employees," Whitefield commented.

Union View

"We think it was a good decision on their part," said Steve Rosenthal, a spokesman for the Communication Workers of America (CWA), which represents many of AT&T's production workers. "Whatever it was based on is really secondary.

"We're concerned about all workers who are exposed to those types of chemicals (i.e., those used in clean rooms) and what the effects might be on everybody, and not just on pregnant women," Rosenthal added.

The CWA is attempting to join with organizations around the country, including occupational health and safety,

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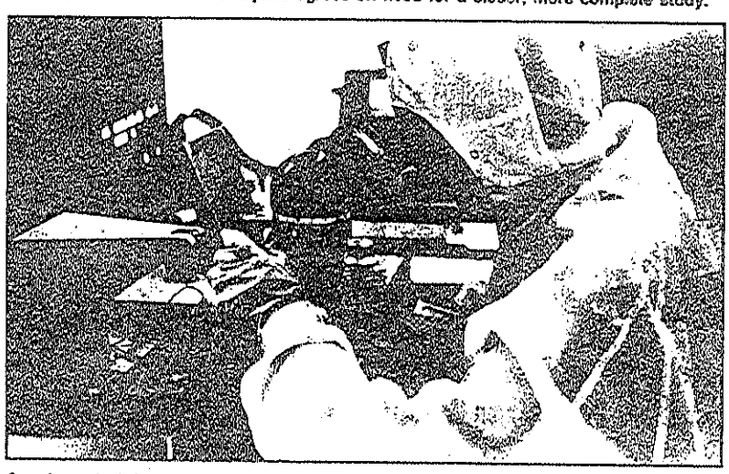
Clean room workers, in their typical attire at a semiconductor production line: Study of DEC workers found a higher rate of miscarriages among production workers than in the general population. The findings have touched off a storm of controversy over how safe the clean room operations are. But everyone agrees on need for a closer, more complete study.



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community and anti-toxic groups, to form a "whole campaign to try to make workers in semiconductor plants ... aware of the possible hazards of working around toxic chemicals."

Safety Programs

The existence of safety programs on semiconductor production lines is another sore point among companies and community groups.

Many chip manufacturers describe elaborate safety programs for employees in the fabrication areas. These include the use of protective clothing, intricate exhaust systems and alarms that go off when a leak has occurred or an exhaust system has failed. Most companies also offer employees training on the chemicals they use daily.

"I feel the safety programs in the semiconductor industry as a whole are the best in the nation for any manufacturing group," said the SIA's Pedersen.

Others beg to differ.

"When you look at safety programs designed to protect the workers, I think they're real minimal," said SCOSH's Mendel-Reyes. "What [semiconductor manufacturers] call a safety program is simply a lot of emphasis on not getting the chips contaminated."

Joseph LaDou, acting chief of occupational medicine at the University of California at San Francisco, has been closely tied to the issue for several years.

Semiconductor industry safety programs, LaDou explained, "vary tremendously, from some of the best in any industry to some of the worst."

The reason, LaDou suspects, is tied to the "newness of the technology" as well as the industry's explosive growth.

Among other things, LaDou has examined worker's compensation data for semiconductor employees. He called the DEC study "small and preliminary," and said a more extensive study is vital.

LaDou said he has been recommending a major study of the health of semiconductor workers for several years. "But we're not talking about one on just reproductive health, or just a cancer survey," he explained.

"We're talking about a prospective study that would take a large group of workers ... and follow them for a long period of time," he added. "You'd start to get reproductive information. You may wait 10 years for some chronic illness to show. And you may wait 20 years for cancer."

"The important thing is you've got to start before you learn anything."

Professional Pipeline

By Joan Stapleton

1986: TECHNICAL DEMAND REMAINED FLAT

Here's some information from **Deutsch, Shea & Evans Inc.** th comes as no surprise to most of us: In 1986, demand for technic personnel was lousy. Well, that's not *exactly* what DS&E said.

The human resources advertising and research organization recent reported that its High Technology Recruitment Index remained "stat ... and low" during the final quarter of last year. And that mea technical recruitment ended the year in the same sad state it began i

Commented Marjorie Freedland, vice president and director of r search for DS&E: "1986 was a disappointing year for technical recrui ing, extending a slump that has continued virtually unabated since M 1984." That news is not too shocking, considering the bywords f employees in the high-tech arena have been "layoffs," "furloughs," "earl retirement," and "frozen salaries." And no one seems to see an end i sight.

Why are things so bad?

DS&E cited a bevy of factors contributing to the slump in technic demand: foreign competition; the sluggish economy in general and th electronics and semiconductor industries in particular; overly optimisti projections of business and consumer purchases of computers; the specte of balanced-budget legislation and curtailment of government spendin the shuttle disaster and subsequent delay in the space program; and th rash of high-tech mergers, acquisitions and reorganizations.

Any one of the above factors would have in some way affected technica hiring, the DS&E report noted. But, the report added, "all occurring i the same year resulted in an economic environment not conducive to hiring turnaround."

The DS&E index, first set up in 1961, is based on the volume o recruitment advertising directed to engineers and scientists in majo U.S. newspapers and technical journals.

FIFTH IEEE CAREERS CONFERENCE SCHEDULED

The IEEE has announced that its fifth biennial **Careers Conference** will be held Oct. 14 to 16 at San Diego's Hyatt Islandia Hotel. The theme of this year's conference is "The Engineer's Life and Career in Today's World." Several sessions will feature papers chosen by competition Sample topics include:

- Bridging the Engineer-Manager Communication Gap;
- Engineering and the Family;
- Successful Careers for Women Engineers;
- The Prospect for Long-Term Engineering Careers;
- Career Development in Small Companies;
- Perspectives in the First Five Years of the Engineer's Career;
- Participation in the Management Decision-Making Process;
- Career Satisfaction Outside of Management;
- Surviving the New Job Insecurity Due to Takeovers, Mergers and Operations Moved Overseas.

Abstracts of 400 to 500 words should be submitted to Bill Anderson, IEEE, 1111 19th St. N.W., Washington, D.C. 20036, by March 15. Papers will be selected by the Program Committee. Authors will be notified of acceptance by May 1.

AMERICAN ENGINEERING ASSOCIATION BENEFITS

The American Engineering Association, a national organization, recently announced it would offer hospitalization benefits and life and disability insurance to its members. "There appears to be a great need in the engineering community for quality insurance which will provide a continuity of coverage from job to job," noted **Bill Reed**, president of the Texas-based group.

Reed called the program one "designed by an engineer for engineers," and said it should be an "ideal solution" for contract engineers, consultants, or for those "who maintain membership in a technical society for the insurance benefits only." The insurance program is the first entry in a comprehensive benefits program planned for the organization. For more information, contact the American Engineering Association, P.O. Box 18473, Fort Worth, Texas 76118. Phone: (214) 264-6428.