

# ARIZONA BUSINESS GAZETTE

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## Miscarriages linked to jobs in chip making

*Motorola, Intel offer transfers*

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Motorola Inc. and Intel Corp. continue to use ethylene-based glycol ethers, despite a recent, industry-financed study that linked the chemicals to high miscarriage rates.

However, Motorola and Intel officials say they have informed workers of the study, and they are allowing pregnant women to transfer out of the work areas where ethylene-based glycol ethers are used.

Meanwhile, the computer chip makers say they are working to find substitutes for ethylene-based glycol ethers, which are solvents used in photoresist, a light-sensitive material used to imprint circuitry on computer chips.

Recently released results of a study by the University of California-Davis showed that computer chip manufacturing workers suffer 40 percent higher miscarriage rates than other semiconductor workers.

The results of study, financed by the Semiconductor Industry Association, were released only weeks after a Johns Hopkins study backed by IBM found similar results. And an earlier study, published in 1988,

showed a greater number of miscarriages occurred among fabrication (as chip manufacturing is known in the computer chip industry) workers than non-fabrication workers at a Digital Equipment Corp. facility in Hudson, Mass.

No policy change was made at Motorola as a result of the study, said Jeff Goran, a Motorola spokesman in Phoenix. Even before the study results were announced, the company had allowed pregnant women to transfer out of manufacturing, he said.

"If a woman who becomes pregnant is concerned about working in an area where chemicals are used in our manufacturing facilities, we will — along with the concurrence of her physician as to that request — remove her from that area for the duration of the pregnancy," Mr. Goran said.

The pay for such workers is not cut in these transfers, he said. However, the transfers are allowed with the understanding that after the pregnancy is over, the employee will return to manufacturing, he said. Motorola also will try to accommodate the transfer requests of women who are trying to conceive, he added.

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Mr. Goran said he could not provide a count of the number of Phoenix area Motorola workers who work in areas where ethylene-based glycol ethers are used. More than 43,000 people work at various sites around the world in Motorola's semiconductor division, he said. Of those, "fewer than 500 women work in areas in the vicinity of where these ethylene-based glycol ethers are," he said.

Motorola's semiconductor division employs about one-fourth of its workforce, or about 11,000 to 12,000 workers, in the Phoenix area, he said. He added that the number of Phoenix area female employees who work in areas where ethylene-based glycol ethers are used is roughly proportionate to the worldwide employee numbers. That figures to 125 women, but Mr. Goran would not confirm that number.

Ethylene-based glycol ethers are used at Motorola's semiconductor facility on 52nd Street in Phoenix as well as at Motorola facilities in Mesa and Tempe, he said. He said he did not know how much ethylene-based glycol ethers are used by Motorola in the Phoenix area.

Industry representatives say ethylene-based glycol ethers typically are applied to wafers by machines, which are hooded and vented to protect workers from the fumes generated by the evaporation of ethylene-based glycol ethers.

Also, monitoring devices are used to detect the presence of ethylene-based glycol ether in work areas. Equipment maintenance was mentioned by several sources as a possible cause of exposure to ethylene-based glycol ethers.

As for the continued use of ethylene-based glycol ethers, "We don't believe that we've got any significant exposure to employees here at Arizona," Mr. Goran said. "But we're certainly going to review all our safety systems and safety precautions."

The studies linking ethylene-based glycol ethers to miscarriage prompted a policy change at Intel, which operates a plant in Chandler, says Howard High, a spokesman at Intel's headquarters in Santa Clara, Calif.

Pregnant women are allowed to transfer from "fabrication," or chip manufacturing, without a doctor's note, Mr. High said. Also, those women will not have their pay cut,

he added.

Women who want to conceive will first be offered fabrication jobs away from areas where ethylene-based glycol ethers are used, he said. Such job change requests will be accommodated immediately, he said. Women trying to conceive who want to work outside fabrication altogether also will be transferred, Mr. High said. At their temporary jobs outside fabrication, such women will be given a year to either conceive or find permanent jobs elsewhere in the company, he said.

"It would be expected" that women would return to their fabrication jobs after their children are born, Mr. High said.

In the Intel facility in Chandler, about 40 employees work in areas where ethylene-based glycol ethers are used, said Sandy Black, a Intel spokeswoman in Chandler. Also, probably 16 or fewer maintenance employees work in those areas, said R. Thomas Lane, Intel's environmental health and safety manager.

However, Intel provided training on the dangers of ethylene-based glycol ethers to about 400 workers involved in chip manufacturing in Chandler, Ms. Black said. The training was provided in the days immediately following the announcement of the Cal-Davis study results, she said.

Ms. Black said she did not know the gender breakdown of the employees who work in areas where ethylene-based glycol ethers are used. She also said she was not aware of any women who had requested to leave the areas.

The four-year, \$3.8 million Cal-Davis study involved 15,000 workers at 14 computer chip company sites in seven states. The names of the companies participating in the study were released, but not the identities of the workers or their work sites. Officials will not reveal whether any Arizona workers participated in the study.

The Cal-Davis study of 950 pregnancies showed a 14 percent miscarriage rate for women working in wafer fabrication areas vs. a 10 percent rate for women who work elsewhere in computer chip companies.

The study was paid for by Semiconductor Industry Association members. The member companies also provided access to their

workers for the study. Industry representatives familiar with the situation say the study was intended to settle concerns raised by earlier, smaller studies as to the health risks associated with ethylene-based glycol ethers.

The university study results come only weeks after results of an IBM study that also found high miscarriage rates among computer chip workers. The IBM study, carried out by researchers at Johns Hopkins University, found a 33 percent miscarriage rate among pregnant women who worked in IBM chip plants between 1980 and 1989.

Ten out of 30 pregnant women who worked with the chemicals in two specific processes had miscarriages, compared to 62 miscarriages out of 998 pregnancies for all chip plant workers.

Safety experts at places like the Santa Clara Center for Occupational Safety and Health say the two recent studies are not the first evidence of reproductive hazards associated with ethylene-based glycol ethers, and that the industry has moved too slowly in addressing the problem. About 70 percent of the more than 35,000 chip-production workers in the United States are women.

However, Motorola and other computer chip companies are working to "phase them (ethylene-based glycol ethers) out of our production process," said Mr. Goran, the Motorola spokesman. He added ethylene-based glycol ethers are used less today in the computer chip business than in the past.

Intel also aims to replace ethylene-based glycol ethers, and the health risks associated with their use, said Mr. Lane, Intel's environmental health and safety manager in Chandler.

He said the company hasn't established a deadline to eliminate the use of ethylene-based glycol ethers "because we haven't reviewed all the options."

Other Semiconductor Industry Association members doing business in the Phoenix area participated in the study. They include Advanced Micro Devices, AlliedSignal, AT&T, Digital Equipment Corp., National Semiconductor, Northern Telecom and VLSI Technology. However, apparently none of the companies manufactures computer chips in Arizona.