

Reproductive hazards in the workplace

Confrontation over issues surrounding genetic protection involves chemical companies, unions, workers' rights groups, and several government agencies

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The stage is set for confrontation. The overture began in the mid-1970's when workers in plants manufacturing chemicals such as kepone and 1,2-dibromo-3-chloropropane (DBCP) began to complain of sterility and other reproductive deficiencies caused, they thought, by exposure to these chemicals.

The curtain rose late last year when the Department of Labor cited American Cyanamid for work policies which, it claimed, forced women to be sterilized or lose their jobs at Cyanamid's Willow Island, W.Va., lead pigments manufacturing facility.

At about the same time, a woman in Ohio brought suit against B. F. Goodrich Co. for not allowing her to continue to work in an area where vinyl chloride is polymerized because of the potential risk of chemical exposure to a fetus should she become pregnant.

The 1980's as a "decade of genetic confrontation"—which one labor leader already is calling it—seems well under way.

It is a confrontation that is drawing in many parties. Labor unions and other workers' rights groups are involved. Coalitions of many of these groups are forming. Probably most notable is the Coalition for the Reproductive Rights of Workers (CROW), which pulls together labor unions, women's rights groups, and legal groups concerned with possible violations of an individual's right to fair employment in the name of genetic protection.

The federal government also is involved through several different agencies. The Occupational Safety & Health Administration in the Department of Labor has taken the lead among the government agencies. Its interest comes from its charge to assure a healthful workplace for all employees. But the federal agencies

responsible for assuring equal treatment of men and women in employment also are involved, principally the Equal Employment Opportunity Commission and the Department of Labor's Office of Federal Contract Compliance Programs. Just last week these two agencies issued joint guidelines to employers on which programs aimed at protecting workers' offspring they would consider nondiscriminatory.

And, of course, the chemical companies are involved. So far, their role remains the key one, for individually they are still setting personnel policies within their companies. There were no uniform federal guidelines until last week, and it is still too early to see the impact of the new guidelines on company policies. Labor unions and other workers' rights groups, for now, are aiming their efforts primarily at influencing the government to control the companies tightly. They have only begun in a small way any direct action against the companies themselves.

The most recent cases to draw public attention have centered on the question of women working in certain areas. But women workers are only part of the issue. Men, too, can be affected by exposure to certain chemicals, and such exposure could very likely cause abnormalities in offspring.

A case in point is that of chemical workers at a Rensselaer, N.Y., chemical plant that made Oryzalin, a herbicide sold by Eli Lilly & Co. for con-

trol of weeds in soybean and fruit crops. Last November, the International Chemical Workers Union urged OSHA to shut down the Rensselaer plant and the Environmental Protection Agency to ban the use of Oryzalin, charging that the Lilly herbicide was responsible for birth defects or miscarriages among the offspring of five male workers at the facility.

According to the union, no normal pregnancies occurred in the families of the 110 workers at the plant during the 18 months that the compound was being produced there. But three children were born with heart defects, a fourth, who died of pneumonia two months after birth, also may have had a heart defect; and a fifth pregnancy ended in miscarriage. In each case, it was only the fathers of the children who worked with Oryzalin (C&EN, Nov. 12, 1979, page 6).

OSHA and the National Institute for Occupational Safety & Health are looking into the union's claims about Oryzalin, both at the Rensselaer plant and at other locations where Oryzalin is made. So far, according to ICWU general counsel Salvatore J. Falletta, NIOSH has not found any evidence of harm to offspring of workers at other locations. This does not mean that the chemical is not the source of the problem, Falletta points out. It may, for instance, be handled differently at the other locations, posing a hazard only at the Rensselaer site. OSHA's final report on the question is expected in the next few weeks.

Eli Lilly says that the birth defects among the families of workers at the Rensselaer plant are "multiple coincidences" and have nothing to do with exposure of the fathers to Oryzalin or its precursors. This is the conclusion of the New York Institute of Birth Defects and doctors at the Albany Medical Center, who have been investigating the cases since the first of the children were born in 1976, the company says.

This article is part 1 of a two-part series. Here, C&EN examines the issue of male reproductive hazards, disputes that seem headed for court settlements, and the government's emerging position. Part 2 will examine how government, chemical companies, and unions are approaching the problems of worker protection.

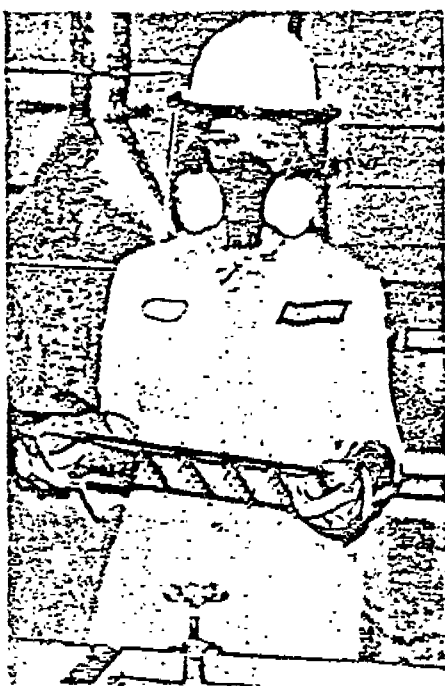
A case in which the data more definitely establish a connection between occupational exposure to certain chemicals and effects on male reproductive function is that of DBCP, a soil fumigant used to control nematodes. Studies in laboratory animals and human data indicate that exposure to relatively low levels of this compound can reduce sperm counts enough to cause sterility. When data on the effects on human workers became public in 1977, the two major U.S. producers of DBCP, Dow Chemical and Shell Chemical, both stopped making it.

OSHA quickly issued temporary emergency standards for exposure to nonagricultural workers of 10 ppb in the air. OSHA's permanent standard, issued in 1978, set the exposure level at 1 ppb. EPA restricted use of the compound to a limited number of crops, chiefly citrus fruits, in 1977. Even these uses are now being challenged, however, since data gathered last summer show unexpectedly high levels of DBCP in drinking water near agricultural areas.

There is also concern that DBCP may cause birth defects in the children of workers exposed to it. One suit is under way involving California DBCP workers who claim that their sons were born with defective penises because of the workers' exposure to the chemical.

However, probably the compound attracting the most attention, because of its possible effects on male fertility or on offspring through the fathers' exposure, is 2,3,7,8-tetrachlorodibenzo-*p*-dioxin, the contaminant in agent orange, the military herbicide used in Vietnam. Suits and countersuits have been filed in federal courts concerning the exposure of about 3000 Vietnam veterans to the compound. A Vietnam veterans group that is suing on behalf of these veterans claims, among other things, that exposure to the herbicide led to loss of sexual ability in the men and malformations in their children (C&EN, Jan. 21, page 14).

Although the veterans' suit charges birth defects associated with agent orange exposure in Vietnam, data on this point are not uniformly accepted as conclusive. NIOSH is in the midst of a multiple-generation study with rodents designed to show whether exposure to the chemical by the father can cause defects in his offspring. And at least one of the chemical companies that supplied the Defense Department with agent orange during the Vietnam war is conducting a massive study of its workers who made the herbicide to determine whether there have been any reproductive effects in this group.



With women exposed to chemicals in work activities, such as this plating operation, concern has focused on reproductive hazards of chemical exposure

Despite the very real concern over reproductive hazards to men arising from exposure to hazardous chemicals in the workplace, the focus of this issue at the moment is on women. Nearly all chemical companies, and a great many toxicologists, generally maintain that there are chemicals that can damage a developing embryo or fetus but are not harmful to a healthy male or female adult. Controlling worker exposure to these substances is causing most of the current concern.

Not everyone agrees with this viewpoint. Anthony Mazzocchi, director of health and safety for the Oil, Chemical & Atomic Workers International Union (OCAW), for instance, says existing data do not show the fetus to be any more vulnerable to chemical damage than the sperm. "We know of no substance that affects the fetus and not male sperm," Mazzocchi says.

The emerging government position appears to be somewhere in between these two views. That is, it does not state that a substance that affects the fetus must necessarily also affect the sperm, but it does caution companies that such effects are possible and cannot be ignored without the risk of the company's being charged with sex discrimination.

Companies whose workers are exposed to reproductive hazards in the workplace may not discriminate in the hiring or work assignments of their employees on the basis of sex, including pregnancy or childbearing capacity, say the new federal guide-

lines issued last week by the Equal Employment Opportunities Commission (EEOC) and the Department of Labor's Office of Federal Contract Compliance Programs (OFCCP).

Companies may establish "neutral" policies to protect employees and their offspring from reproductive hazards, but they must be certain that in practice the plans do not adversely affect only one sex.

However, the new guidelines do allow for "temporary" exclusion of workers of one sex only from a workplace under certain conditions. The first of these is that there be reputable scientific evidence that the hazard is likely to harm only one sex or only pregnant employees. The employer also must show that it has thoroughly searched the scientific literature and cannot find evidence of a similar hazard for the nonexcluded sex. Finally, companies must begin, within six months, research projects to find out whether the chemicals in question also produce adverse reproductive effects in the nonexcluded sex. These research projects are to be conducted under "accepted scientific methods" and produce results within two years.

For now, these are only proposed guidelines. Chemical companies and others are being given 120 days to comment on them before they come out in final form.

The EEOC-OFCCP position reflects concerns sounded earlier in statements by officials at both NIOSH and OSHA. In a letter last month to B. F. Goodrich's manager of industrial relations F. R. Pruitt, for example, NIOSH director Anthony Robbins discusses the lack of adequate data in some cases for establishing safe levels of exposure to certain chemicals for an unborn embryo or fetus. "We must, however, stand firm on the principle that if an exposure is sufficiently toxic to produce genetic damage in an unborn child or in a fertile female, then it must be considered to be equally toxic to the fertile male worker and to his unborn child," Robbins says. "There is a priori no reason to believe that the genetic material of a male worker is in any way more resistant to toxic occupational injury than that of the female. In addition, we feel that workers of both sexes should be counseled regarding the nature of the materials with which they work and the potential toxic effects on them and on their offspring."

Robbins' letter marks a definite change from the agency's stand on this question in the early 1970's. In 1974, for example, NIOSH's occupational exposure standard for vinyl chloride recommended that "no

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land was particularly difficult because of the small size of the facility, Fead says. The same policy was put into effect at about the same time at Cyanamid's pharmaceutical manufacturing facility, Lederle Laboratories, with a very different outcome, Klyne says. There, 15 or 20 women were affected. They were counseled individually, rather than in group meetings as at Willow Island, and, as Klyne puts it, "The women took a far more reasonable approach." All were transferred within a couple of days into new permanent positions within Lederle at the same pay as before. Most of the women transferred from production to packaging lines within the same plant, he says. There have been no indications of dissatisfaction from these transfers, Klyne says.

Klyne attributes the main difference in the effect of the policy at the two plants to the fact that Lederle is about 10 times larger—with about 2000 jobs—than the pigments facility at Willow Island. Thus, equivalent positions were immediately available for women who were transferred out of hazardous work areas. At Willow Island, equivalent jobs were not immediately available, and the women had to be placed temporarily in lower-status jobs, although with retention of pay, until openings became available.

To OSHA, which cited Cyanamid for its actions at Willow Island and fined the company \$10,000, any extenuating circumstances at that site are no excuse for a policy that ultimately led some women to have themselves sterilized rather than risk losing their jobs.

"It seems a very simple thing to us," says OSHA senior policy analyst Margaret R. Richardson. "You do not protect workers by inducing them to harm themselves. If an employer has people working on a roof and does not want to put a fence around the roof or provide them with safety harnesses, he can't nail their feet to the roof to keep them on."

In citing Cyanamid, OSHA is attempting to expand its authority over the setting of safety standards in the workplace. In addition to citing Cyanamid for not being in compliance with the lead standards for adults at Willow Island—a side issue that is sure to complicate the matter—it also cited the company under the general duty clause of the Occupational Safety & Health Act of 1970. This is the first time this clause has been used to justify an OSHA citation.

The clause says that the employer must provide an environment free from recognized hazards likely to cause death or serious physical harm. Serious physical harm includes harm

to the reproductive system caused by sterilization, OSHA is saying with this citation. "No worker must be forced to sacrifice his or her right to conceive children in order to hold a job," OSHA's Bingham says.

The Willow Island case was supposed to be heard by an OSHA administrative law judge—the first forum for disputing the citation—last December. The hearings have been

"Where we cannot protect the fetus, we are required to move it away from the hazard, and that has to mean moving the mother as well"

postponed, however, although they probably will be held very soon.

Another case that has been briefly in the courts and is likely to be back again involves a woman who worked for Goodrich Chemical Co. in Avon Lake, Ohio. The woman, Carole Doerr, worked in a vinyl chloride polymerization area and was removed from there last August when Goodrich introduced a policy of not allowing women who could be pregnant to work in areas where they are exposed to vinyl chloride.

The Goodrich policy covers 10 chemicals besides vinyl chloride. They are benzene, carbon tetrachloride, chloroform, chromium(IV), lead, methyl ethyl ketone, ethylene thiourea, mercury, acrylonitrile, and dimethylacetamide. When the policy went into effect last summer, about two dozen were found to be working in areas where they were exposed to at least one of these fetotoxic substances, says Goodrich director of health and environmental services Harold W. Dietz.

For these substances, the company does not absolutely prohibit exposure, Dietz says, but has what he calls a "practical zero." "We won't put fertile women in an environment where we know they are exposed," he says. "The fetus needs an extra degree of protection that is not feasible or required for adults. We have solid evidence that this is true."

According to Goodrich, Doerr and the other women affected by the policy were counseled individually about the reasons for the policy and were offered other jobs at the same plant with the same pay. Doerr was offered a position with the same job title as her old job in a different building at the Avon Lake facility.

She chose, instead, to stay in the same building in a lower-status job, still at the same pay. But she wants her old job back and has complained to the Equal Employment Opportunity Commission, charging sex discrimination.

Doerr bases her charge on medical evidence that vinyl chloride, in addition to possibly being a transplacental carcinogen, is also a mutagen that causes damage to sperm. Therefore, she contends, Goodrich's policy, which protects the fetus only from the cancer risk arising from the mother's occupational exposure to vinyl chloride and not from the mutation risk caused by the father's exposure, discriminates illegally by sex.

Doerr filed suit in the U.S. District Court in Cleveland last October and asked for a temporary injunction so that she not be removed from her old job. The suit was denied on a technicality—she had failed to get a right-to-sue order from the Equal Employment Opportunity Commission after first filing the complaint with them. The temporary injunction also was denied because the court felt that since her new job retained the pay and seniority of her original position she would not suffer irreparable harm by remaining in it until the dispute is settled. The court also said she hadn't demonstrated the substantial likelihood of winning her suit, another requirement for a temporary injunction.

In his decision, Judge Robert B. Krupansky spells out what he sees as the relevant issue to be decided in this case, should it ever be refiled in the proper manner: "the comparative risks of transplacental carcinogenesis on the one hand and male mutagenesis on the other resulting from exposure to vinyl chloride at the current permissible levels." These risks "are not well established, as the medical evidence to date appears largely inconclusive," he continues. "To the extent that it can be subsequently demonstrated that the risk of fetal damage associated with transplacental carcinogenesis is substantially greater than that associated with male mutagenesis, it might appear that defendant's policy is grounded upon a legitimate, nondiscriminatory factor." Just how EEOC's new guidelines will affect this issue, if at all, remains to be seen.

Goodrich expects to see the case return to court. "It is very clear that B. F. Goodrich Co. is not going to be able to settle with Ms. Doerr in a way that will satisfy her," says director of industry affairs F. Terrence Flannery. "The judge has spelled out what we think is the issue. We are prepared to defend on that." □



Infante: need to identify hazards

stances." She said that the view that certain substances present a special health risk to the fetus is often unsubstantiated.

"The laws of this nation are committed to guaranteeing both healthful working conditions and equal employment opportunity," she said. "I believe, therefore, that employers should exhaust all possible avenues of worker protection (be they engineering controls, work practices, personal protective equipment, etc.) before considering the adoption of exclusionary practices."

OSHA would like to see two things change about the way most chemical companies handle the problem of fetal risk from occupational chemical exposure. The first is to get better data on which to base protection policies, and the second is to provide temporary transfer of women from hazardous work environments rather than permanent exclusion of fertile women from these areas.

"The data are not very good on any aspect of this issue," says OSHA senior policy analyst Margaret R. Richardson. Sometimes employers exclude women from a workplace with very little information on whether there is a hazard to the fetus, she says. Also, toxicologists and epidemiologists have not made a big enough effort to look into the reproductive hazards to males.

"We can't even say how many chemicals are out there that cause reproductive problems in animals, let alone in man," says Peter F. Infante, an OSHA toxicologist who heads the office of carcinogen identification. More work in this area is badly needed, he says, because "in the little study that has been done, we have, in fact, found hazards."

Infante identifies several research areas that need attention before oc-

cupationally related reproductive hazards can be well identified. These include better epidemiological studies of reproduction through standardized occupational history forms for use in the medical community, recording of the occupational history of both parents on birth certificates, and certification of stillbirths as well as live births so that causes of aborted and malformed children can be traced. He also calls for better animal testing for reproductive hazards.

Some chemical company toxicologists, such as Bernard A. Schwetz, director of toxicological research at Dow Chemical, share Infante's concern about the need for more data on reproductive effects.

"I don't think we should overreact to this one potential source of hazard [harm to the fetus]," Schwetz says. "We need to remember that there are other potential routes of harm and study them all."

He cites lead as an example. This chemical does affect the development of the embryo and fetus, he says. It is a teratogen in humans. But research also shows that it may affect male fertility or cause mutations.

Nevertheless, Schwetz cautions, there are such things as teratogens—substances that cause harm to a developing organism at levels that are not harmful to the adult. Mercury and thalidomide, two of the most potent teratogens that have been studied, are only that—they do not cause harm to either male or female adults at the same exposure level that will harm a fetus, Schwetz says.

Dow has been doing reproductive studies on animals for 30 years, Schwetz says. Currently these studies usually involve three animal species (rats, mice, and rabbits) and study the effect of exposure of both male and female animals through three generations of offspring. With such data, he believes, it is possible to set policies to control exposure that are acceptable to all the parties involved.

Though companies may agree with OSHA that more and better data on reproductive hazards would be useful, OSHA's call for temporary removal of women from areas that present fetal hazards rather than permanent exclusion from these areas during their reproductive lives is another matter.

Every chemical company contacted by C&EN says that such a policy does not provide enough protection for the fetus against exposure to toxic chemicals and could not be adopted at that company.

It's a "Pollyanna" approach, says Monsanto's equal opportunity affairs director, Bill McEwen, summing up

industry reaction. This attitude is based in part on medical argument, but it stems, too, from legal considerations.

Legally, the fetus is not an employee, and it did not choose to be in the work environment. Nor is it capable of either understanding the hazards it may be exposed to or of waiving its rights to protection against these hazards.

Worker injuries are covered by workmen's compensation laws, designed to speed up settlement of liability claims, but which also limit an employer's liability toward the worker. But the fetus is legally a "third party." If it is damaged but not killed, the person it becomes can sue for any amount of compensation it can convince a jury is justified. Cases that have gone to court concerning malformations caused by exposure to thalidomide and other drugs in utero lead chemical companies to view this potential liability as enormous. And their health policies reflect this determination to avoid such claims.

"We'd rather go to bat with the regulatory agencies [over possible job discrimination caused by a health policy] than run the risk of open-ended liability should a malformed child result," one chemical company lawyer says frankly.

If the government really wants the responsibility for deciding whether to accept the risk of exposure to fetotoxic substances in early pregnancy to rest with the employee, says Joseph B. Wollenberger, corporate labor counsel for Monsanto, all that needs to be done is to pass a law saying that companies that are following all of the OSHA regulations have no further liability should workers have malformed children.

Such a law would be ridiculous, he adds. The responsibility is the company's and that is where it should stay.

The ideal position on fetal hazards, most companies agree, is to be able to identify safe levels for each of these compounds and keep exposure below these levels everywhere the chemicals are used. Few companies claim to be able to do that in all cases, however.

Monsanto's McEwen sums up what could be the attitude of all chemical employers. The notion that every job ought to be available to every person just isn't true, he says. "There is no such thing as a risk-free environment. As more and more nontraditional jobs open up for people, there are going to be trade-offs."

Monsanto identifies mercury and two or three other compounds as posing particular hazards to the fetus in the work environment. Often the company has been able, through en-