Europe Struggles to Control Pollution

A major accident on the Rhine has highlighted Europe's need for international controls on hazardous chemicals—and the difficulties of imposing them

Paris

No one had predicted that a country which prides itself on the purity of its air and the precision of its watches would be directly responsible for one of Europe's worst pollution incidents of the past decade. For this reason alone, last month's accidental spill from a Swiss factory of 30 tonnes of toxic chemicals into the river Rhine already promises to give a significant boost to efforts to tighten controls on the chemical industry.

Following the widespread public outcry generated by the accident, the Swiss government has begun negotiations with the 12 member states of the European Economic Community (EEC) aimed at bringing its regulations on the handling of dangerous chemicals into line with those adopted by the EEC at the beginning of this year.

The spill occurred after a fire at a plant containing 1250 tonnes of fungicides, pesticides, and other agricultural chemicals owned by the Swiss company Sandoz AG in Basel. More than half a million fish and eels are thought to have died as a 25-mile long chemical slick moved down the river, causing ecological damage which scientists estimate will take 10 years to repair.

Prompted by this accident which has set back efforts to clean up the Rhine that have been going on for several years, the environment ministers of the EEC member states agreed at a meeting in Brussels 2 weeks ago to investigate ways of tightening their own controls on industrial chemicals. They also agreed to investigate how these controls might be extended to neighboring countries which are not EEC members—including Switzerland.

However, at the same meeting they failed to reach agreement on the equally urgent question of acid rain caused by sulfur emissions from power stations. A proposal from Britain for a 30% reduction in sulfur output by 1993, leading to 45% less in 2005, was rejected after Spain and Ireland refused to accept the new limits being suggested.

The outcome of the Brussels meeting highlighted the difficulties of regulating chemical hazards in Europe in a way that meets broad political acceptance. The Sandoz accident has dramatically illustrated the need for greater collaboration between countries where, because of their close proximity, a major accident in one can have dramatic consequences in several others.

"For many years, the danger of transfrontier accidents has not been considered urgent, since there have been very few of them," says Henri Smets of the environment directorate of the Organization for Economic Cooperation and Development (OECD) in Paris. "Everyone knew that they could take place, but the possibility was largely ignored; now we have a dramatic illustration of what can happen."

Officials have reached some agreement on the need to tighten controls on chemicals, but the equally important question of acid rain has continued to elude consensus.

In contrast to the powers of the Environmental Protection Agency in the United States, "it is really a different picture in Europe," says Louis Jourdan, head of technical affairs for the European Confederation of Chemical Industry Federations. "Here, the implementing bodies are the 12 member governments; and in some cases, it is even necessary to get agreement at a local or regional level."

Both aspects have been encountered in developing European-wide regulations on the control of hazardous chemicals. The main instrument for doing this is the so-called "Seveso directive," an agreement reached between the EEC's 12 member states following the 1976 explosion of a chemical plant owned by another Swiss company, Hoffmann–La Roche, in Seveso, Italy, which resulted in the escape of large quantities of dioxin.

The directive came into force at the beginning of this year, 10 years after the accident which triggered it. Each country is required to implement a series of measures intended to identify potential dangers, carry out the necessary risk assessments, and ensure that adequate safety precautions have been developed.

But while agreement has been reached on the desirability of the principles which the directive enshrines, ensuring that they are put into practice is not proving straightforward. All 12 member states were required, under European law, to pass legislation introducing the regulations by the beginning of this year; but only four—Britain, France, Denmark, and West Germany—have yet done so.

Some of the rest, including Holland and Belgium, claim they are on the brink of complying. In others (most noticeably Italy), which lack the highly organized inspectorate required to put the directive into full effect, implementation is likely to take much longer, and the EEC Commission is already initiating legal action in an effort to speed things up.

One particular bone of contention has been over public involvement in assessing hazards and agreeing on safety precautions, including emergency plans. A high level of such involvement is required by the Seveso directive. But while companies in some countries have had few reservations about publicizing their activities in this way, others have been more reluctant to provide either local authorities or labor unions with details of the chemical processes they use.

The main difficulty in establishing European-wide regulations for hazardous chemicals appears to be in ensuring that not only the benefits but also the costs of regulation, both economic and political, are spread equitably.

A precedent for solving divergent interests in purely economic terms took place in 1976 when Holland, the country through which the Rhine flows into the sea, agreed to reduce the concentration of salt in the river by paying France to reduce the salt discharged by state-owned potassium mines in Alsace.

More complex problems, however, require more complex solutions. After a second scare in 1984 linked to Seveso, when French officials had to admit losing track of a truckload of dioxin waste taken from the

land around the stricken factory, detailed new guidelines were drawn up by the OECD, listing the conditions under which toxic waste could be transported from one country to another.

How effective the system will be in reducing the hazards of toxic chemicals remains to be seen. Herbert Klatte, secretary-general of the Brussels-based European Environment Bureau, which represents 75 individual environmental organizations throughout Europe, is skeptical about whether European-level environmental regulations have yet had any significant impact. "Even though there has been a large body of new legislation, the situation in general is not improving; the rivers are still polluted and the forests are still dying." He points out that the EEC Commission has brought 68 cases before the European Court of Justice when individual countries have allegedly failed to implement agreed-to procedures.

Industry tends to be more enthusiastic about European-level regulations, partly because common environmental standards mean that a company in one country will not have to bear the cost of more stringent regulations than a competitor in another (a current complaint of chemical firms in West Germany), and partly because international safety norms may turn out to be less stringent than those imposed at a national or local level.

Jourdan of the chemical industry federation says that companies may have some reservations about the implementation of the Seveso directive, for example in countries such as Holland where highly quantified risk assessments are being demanded. In general, however, he says that companies support the principles on which the directive is based; he points out that the chemical industry in Austria, a country where environmentalist groups are rapidly increasing their political power, is pushing for the directive to be extended to cover them.

The EEC Commission, under instructions from the environment ministers, is now examining the content of its directive to see how it should be modified to reduce the chances of similar accidents in the future. It is also discussing ways of improving its international alert system—aware of the fact that it was German, and not Swiss, authorities who first raised the alarm after the Sandoz spill.

"I think the accident will have a double effect," says an OECD official in Paris. "It will help convince the chemical industry that the levels of safety achieved so far could be significantly improved; and it will help convince politicians that these improvements need to be introduced." ■

DAVID DICKSON

Prospects Discouraging for Minorities in Science

Despite two decades of affirmative action, blacks, Hispanics, and American Indians have been making very little progress in gaining proportional representation in the scientific and engineering professions, according to a workshop held on 21 November at the National Academy of Sciences.

The problem is one of "grave concern," said James Ebert of the National Research Council (NRC), "not only as a matter of principle but a matter of enlightened self-interest." For one thing, blacks and Hispanics will constitute 30% of the population by 2020.

Although women still suffer from discrimination, their progress in comparison with minorities has been rapid—for example, there has been a 181% increase in science and engineering doctorates awarded to women since 1970. But the obstacles faced by minorities seem to be deeper and more numerous.

Blacks, for example, more often come from families with no tradition of higher education (one speaker observed that there was no high school for blacks in his town in West Virginia until 1949). Almost half attend predominantly black high schools. Blacks tend to receive less encouragement from teachers to go into science and are less likely to take advanced courses in high school. Many college students drop out because they run out of money.

All these factors serve to shrink the pool of potential science graduates. Although blacks make up 10% of the labor force, they are only 2.5% of the science and engineering work force. Even this figure overrepresents the proportion doing science, because, according to Michael Crowley of the National Science Foundation (NSF), many are social and behavioral scientists hired for managerial positions by local governments. Black scientists also have the highest rate of underemployment, and those in the physical sciences have the highest unemployment rate (5.6%).

Probably the single most discouraging indicator relating to minorities' lack of progress is persistently low performance on the Scholastic Aptitude Test (SAT). According to the Educational Testing Service, although black SAT scores have been improving relative to those of whites, they are still more than a standard deviation below white scores. In 1985 the white average for the verbal test was 449; the black average 346. Mexicans and Puerto Ricans scored 382 and 373 respectively. On the math test, whites averaged 490, blacks 376, and Puerto Ricans 405. Asians, who are overrepresented in higher education, averaged 518.*

The attrition rate is high for those who make it into college, mainly because of financial difficulties and lack of adequate preparation. Manpower expert Betty Vetter reported that among engineering students, 70% complete school, but the completion rate among blacks is 30% and among Hispanics 40%. Blacks who attend white colleges also have serious adjustment problems, and often suffer from feelings of isolation and inadequacy as well as from lack of interaction with professors and a shortage of black role models—particularly in science.†

Black males are having an especially hard time of it. The ratio of males to females enrolled in college is about 2:3. Black enrollments in engineering (still an overwhelmingly male discipline) have been leveling off since 1980. According to Cheryl Leggon of the NRC, in 1975 one-third of black Ph.D.'s were women; in 1985 blacks overall had made little progress but the proportion of women Ph.D.'s had grown to one-half. One-quarter of the black science and engineering work force is now female, compared with 13% for whites. Most statistics combine gender data, noted Leggon, which "obscures the fact that differences between genders can be as big as majority-minority differences."

Participants at the workshop were glum about bringing about any near-term changes in the prospects for blacks and Hispanics in science. But one theme that emerged was the importance of intangibles—faculty encouragement, "mentoring," vocational counseling, and information on minority programs and sources of finances.

Howard Adams, the dynamic head of the National Consortium for Graduate Degrees for Minorities in Engineering in Notre Dame, Indiana, emphasized that for all the efforts of schools and the government, "students don't have the information" on resources available to them. Many have "never heard of NSF." They need to be actively recruited and given information on what's available and how to go for it, said Adams. "They are not going to respond to notices—they assume it's not for them." ■

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*Figures are contained in the National Science Foundation's biennial report on "Women and Minorities in Science and Engineering," January 1986.

†A survey of recent black graduates of the Massachusetts Institute of Technology, "The Racial Climate on the MIT Campus," documents some of these problems.