A headache for US industry

On April 28, 1971, the Occupational Safety and Health Act came into effect in the United States, establishing a new agency—the Occupational Safety and Health Administration (OSHA) in the Department of Labor—with a mandate to enforce health and safety standards for America's 60 million workers. As expected, the act has turned out to be a huge headache to enforce and administer, not only because of the enormous costs to industry in altering its technology and work practices to comply with federal standards, but also because the act does not diminish, but raises, discontent about conditions in the workplace. It exposes the sores of industrial practices and labour union conservatism and raises the profound question of what research in occupational health should be directed towards. Wil Lepkowski reports.

NEXT month, OSHA will begin a series of public hearings on its proposed noise standard of 90 decibels which will be both long and costly. Dow Chemical Corporation alone has asked for five days to present its case against that proposal. Consumer and labour groups, on the other hand, will argue for the figure of 85 dB being pressed for by the Environmental Protection Agency (EPA). (The EPA's standards inevitably are more stringent than OSHA's, on the unspoken assumption that the workplace is inherently more dangerous than the outdoors).

The case against noise will be argued in the context of hearing loss, but another aspect is creeping into the acoustic consciousness: frequency. Psychophysicists are finding that various frequencies can exert subtle but profound effects on the human brain and nervous system. If the 90dB level is adopted (and the EPA will fight its sister agency OSHA for the 85 dB standard to be established), it will cost industry \$30,000 million to comply, according to a study by the engineering consultant company Bolt, Beranek and Newman. If research is able to correlate frequencies with, say, the accident rate or the vague condition known as *ennui* then occupational safety and

health could reach another level of complication involving design of machinery and the mind-body-environment interaction in the workplace.

Consider stress, for example. The research arm of OSHA, the National Institute of Occupational Safety and Health (NIOSH), recently published proceedings of a conference on behavioural toxicology which raised questions about the role of stress in job safety, health and performance. OSHA is nowhere near developing standards for reducing stress on the job—unless one regards noise and heat as stress inducers. But OSHA's standards director Daniel Boyd agrees that stress is an obvious problem in the workplace which is related to development of chronic disease, and that standards will eventually govern work practices that produce stress. The question, however, is how one separates workplace stress from stresses of the home, family, and environment. At what point does occupational health spill over into community health?

Cancer is often considered to be a disease induced in the workplace, but heart disease is not. Why? Because carcinogens are known to be present in the workplace, whereas non-psychological causes of heart disease are harder to spot. Thus, heart disease is considered a community health problem, whereas cancer is increasingly looked on as a job-related disease.

The new NIOSH Director, John Finklea, will have plenty of housework to do before he ventures out with his first indictment. The agency's entire research programme is ripe for reorganisation, for example. "There's no direction to the research they do there," declares Nicholas Ashford who is completing a large study of the occupational safety and health for the Massachusetts Institute of Technology Center for Policy Alternatives. "There are no deliberate attempts to formulate any kind of research policy based on real problems in the workplace," he says. "They don't bring input from labour into the design of their research projects. What they have is a lot of old-time researchers who are accustomed to pursuing their own interests and going their own way without regard to the timeliness of their work"

Sheldon Samuels, director of health, safety, and environmental affairs for the Industrial Union Department of the AFL-CIO, is even harsher. "They have a lot of dead wood and meaningless programmes there," he says. "Their hazard evaluation programme is a total failure. The evaluations they do are meaningless. They don't really evaluate present and future hazards. All they do is measure how close companies come to the threshold limit values. And when they get important

information they sit on it without alerting anyone."

Finklea is keenly aware of the criticisms. One of his plans is to reduce by 10% all newly induced cancers in the workplace. The strategy is unclear and, as the forward plan for NIOSH states, "the full impact may not be evident for approximately 20 years because of the disease latency period". What will certainly be involved is coordination with several agencies that deal with carcinogenesis, as well as a much stepped up cancer epidemiology programme. For example, the National Center for Health Statistics has no data on disease broken down by occupation. That will have to change.

Just as rising water finds every nook and cranny in a tidal cave, so OSHA extends into every occupation in the United States. In the operating theatre, studies have shown that anaesthetic gases are the cause of birth defects in the children of nurses exposed to those gases and even in the children of male physicians similarly exposed. OSHA is satisfied, however, that the medical profession is doing an adequate job of regulating its own operating room environment now that the danger is known.

It is even conceivable that OSHA could regulate the methodology of genetic research if the scientists themselves do not succeed in drafting a set of procedures that prevent the spread of potentially hazardous organisms into the atmosphere. The subject was raised by a Washington lawyer, Harold Green, during the meeting on genetic transplantation organised by the National Academy of Sciences at Asilomar, California.

A lawyer from the University of Indiana, Roger Dworkin, warned that if scientists did not regulate that research, OSHA could move in and do it for them.

The individual most responsible for the direction that occupational health research takes at a national level is John Finklea. A South Carolina paediatrician, he has a penchant for controversy as well as skill at diplomacy and could be a much-needed antidote to his predecessor Marcus Key, who preferred diplomacy at all times. As head of the National Environmental Research Center under the EPA, Finklea was in the thick of the debate over sulphate pollution from power-plant chimneys and from the catalytic converters in automobiles. Suffice it to say that Finklea's position as an opponent of tall chimneys and the catalytic converter hastened his departure from the EPA.

Finklea has the backing of both environmental and labour groups, but industry is cautious. "It's true Finklea doesn't shy away from controversy,"

says Kenneth Nelson, vice-president for environmental affairs at American Smelting and Refining Company, which was stung by NIOSH's recommendation of a no detectable limit standard for arsenic. OSHA went along with the recommendation and issued it as a proposed standard in March. "His pronouncements on sulphates at EPA were quite devastating. There's absolutely no evidence that they are dangerous in environmental concentrations. But suddenly his position became gospel. I don't want to prejudice him, but this is the kind of thing we don't want to see him do at NIOSH."

The most scaring thing NIOSH deals with is the fear that an 'epidemic' of industrial cancer may be beginning which is several years away from hitting with full force. There's no apparent way to prevent such an event from happening once the cancer process has begun. "We're talking about problems we will have 60 years from now," says Finklea. "That is something we've never faced in NIOSH."

The vinyl chloride episode stunned industry into recognising some of the more frightening consequences of exposure to toxic substances. It was also a huge embarrassment to all the government agencies which oversee environmental health. NIOSH was shocked and embarrassed, but not as acutely as the National Cancer Institute (NCI). NIOSH, after all, could plead scarcity of funds and manpower with its overall budget of \$700 million. The NCI had no such let-out. Critics said correctly that it was guilty of misplaced priorities. Now it is trying to catch up.

Since that episode, the institute has stepped up its cancer bioassay programme to intensify its relevance to occupational exposure to carcinogens. It now issues so-called 'cancer alerts' to an inter-agency panel whenever environmental and epidemiological researchers at the National Cancer Institute come across data showing links between chemicals in production and the cancer process. The latest such alert was issued for trichloroethylene, triggering action by NIOSH's hazard surveillance teams to assess the extent of the problem throughout industry.

The NCI knows it needs much more information about carcinogenesis on the personal level—that is, on the level at which the work environment affects cancer susceptibility and, in fact, prevention. Its newly emphasised cancer control programme will begin studies on cancer control in the workplace. And the environmental carcinogenesis programme under Dr Herman Kraybill, is gradually working out written agreements with companies that will give NCI researchers access to the medical workers exposed to chemicals suspected of being carcinogenic.

Finklea: not afraid of controversy

Industry itself has made a quantum leap into responsibility, not only by opening up its records—unprecedented in the past—and broadening its medical examination of workers to a score of metabolic parameters but also through formation of an inter-company toxicology research programme to give early warning to companies about impending problems. The project is new and requires the working out of some legal difficulties over transfer of what once was considered privileged information. But now worker health is taking precedence over industrial secrecy.

"What we're seeing now," says Kraybill, "is industry moving slowly towards closed systems in its chemical production processes. The big companies can do this. But it's the smaller companies that are causing many of the problems". The small companies do indeed present difficulties. In most cases they exist in small towns where the work force is small and has few other job opportunities. Profits are not substantial, and work and production practices are sloppy. In one rural town in Maryland a small company was found to be poisoning the entire community through the dumping of chemical wastes in an adjoining stream. Research offers no solution to this kind of situation. And even now, it has not been possible to find the customary one-to-one ratio between the offending agent and the mortality in that Maryland village.

Although occupational health researchers see no broadly encompassing methodology that would substitute for the chemical by chemical assessment of

health hazards, they are agreed that a single standard test protocol for bioassay can be developed. The process is somewhat akin to working out an international treaty: a text is drafted and re-drafted until each faction makes the compromises necessary for agreement. The National Cancer Institute is being looked on by the toxicology profession as a high arbiter in the resolution of controversy. It is not a regulatory agency but is the focus for most frontier regions in cancer research and so can be depended on to harness the information needed to present a consensus.

Finklea realises the need for a generalised research theory of occupational health but sees none on the horizon. What he would like to see at the very least is NIOSH run as a single 'system', flowing from workplace problems, to applied and basic research needed to understand it, to the production of a criteria document or OSHA recommendation. As such, he is as much directing policy research as a series of projects. Each criteria document alone now costs close to \$1 million in contractor costs, far too high and counter-productive. And OSHA very often rejects the recommendations set out in them. In the science policy sense, NIOSH, by focusing just on the human problem, does seem to synthesise in one place the many aspects contained in Francis Bacon's dictum to scientists: "... that they consider what are the true ends of knowledge, and that they seek it not either for pleasure of mind, or for contention, or for superiority to others ... but for the benefit and use of life; and that they perfect and govern it in charity." □