Laboratory Chemicals May Come Under Costly OSHA Restrictions

Exposure to chemicals commonly used in research laboratories as reactants or solvents may soon be regulated under a federal agency's proposal on occupational carcinogens. The regulations, which may be enormously costly to academic and private labs, are in the last months of consideration by the Occupational Safety and Health Administration (OSHA).

The agency is at present wrestling with a decision on whether or not laboratories should be exempted, in part or in total, from the regulations, mostly as the result of a limited but passionate outcry from academic scientists that their work will be severely obstructed. "If the very restrictive and expensive rules for handling these chemicals are applicable in the research laboratory, the result will be a large increase in cost, a drastic decrease in the amount of work done, and a stifling of creative science, for no significant benefit," wrote John Baldeschweiler, a well-known chemist at the California Institute of Technology, in a comment typical of several OSHA has received. Both the National Academy of Sciences (NAS) and the Department of Health, Education, and Welfare (HEW) have mounted abortive campaigns to influence OSHA's position.

The regulations are part of OSHA's broad cancer policy, proposed in October 1977 at the impetus of the agency's administrator, toxicologist Eula Bingham. As proposed, the policy would apply to any organization that uses chemical carcinogens, from university labs to commercial chemical manufacturers. The most objectionable and costly provision is a requirement that monitoring devices be used to ensure that exposures to carcinogens are kept below specified limits. Typically, laboratory monitoring is performed by requiring lab workers to wear a small charcoal tube with an air pump attached. Periodically, the tube is sent out to be analyzed by gas chromatography for carcinogens, at a cost of $25 to $50 per tube; the air pumps cost several hundred dollars. Depending on the number of employees in a lab and the number of different regulated carcinogens in use—both of which may be large in academic settings—this relatively modest cost could escalate rapidly, several scientists have claimed. "Whatever the final total is, I'm certain it's more than we can afford," says William Schaefer, a chemist at the California Institute of Technology.

The NAS has been concerned for several years about the impact of OSHA's regulations on laboratories, explaining in a recent document that "the (OSHA) Act contains a large number of provisions, primarily intended for manufacturing situations, which are either unrealistic or inadequate for the regulation of laboratory operations where research and/or educational training are the principle activities." The Academy has offered repeatedly—through the National Research Council—to perform a study of laboratory hazards and of the best ways to minimize those hazards. Twice, it has appealed for funds for the study from OSHA, HEW, the National Science Foundation, and the Environmental Protection Agency.

On the first occasion, during the Ford Administration, the offer was greeted by silence and thus scrapped, according to a member of the Academy who was active in the proposal. When pressed by NAS officials, including president Philip Handler, HEW expressed a desire to pursue its own guidelines for federal laboratories without NAS assistance, as did OSHA. On a second try, early in 1978, a revamped NRC offer aroused the interest of several agencies, but once again was met by the firm opposition of OSHA and HEW.

According to several NRC participants, OSHA replied that in effect, outside advice was not needed; it had a legislative mandate and any guidance from the NRC would be a usurpation of its role. On 22 September, the NRC voted to make a final, last-ditch attempt to secure a foothold in the debate by offering for the third time "to appraise the character and magnitude of laboratory hazards and to identify procedures to minimize risk without crippling laboratory operations." The offer, for an 18-month study costing $250,000, includes for the first time an appeal for private, as well as public, funding (the American Chemical Society, Alfred P. Sloan Foundation, Manufacturing Chemists Association, and the Industrial Research Institute were among those solicited). The study would not be very useful if OSHA goes ahead and imposes its broad-based policy, acknowledged Robert Tardiff, of the NAS Board of Toxicology and Environmental Health.

Meanwhile, HEW—through a subcommittee of its Committee to Coordinate Toxicology and Related Programs—has completed 4 years of deliberation on its own set of guidelines for the occupational exposure of laboratory researchers and students to carcinogens, which may also be useless if OSHA goes ahead with its present proposal. HEW got into the game in 1974 because OSHA had left unregulated many carcinogens present in labs. Perhaps more importantly, the committee—like the NAS—"wanted to eclipse OSHA forays into laboratories," says David Rall, director of the National Institute of Environmental Health Sciences and the committee's chairman.

Members of the committee have always intended for HEW to apply the rules to both federal labs and to the recipients of HEW grants and contracts. The agency appears to have failed at meeting this goal, however, because OSHA has the right of first jurisdiction over both federal and private labs—a major problem for the committee that its members apparently were not aware of until 25 September, when a hearing on the proposal was held at the National Institutes of Health. Early in the proceedings, Rall interrupted a question on the disparity between the proposed OSHA and HEW regulations by declaring that OSHA had no jurisdiction over federal labs. Dennis Derkacs, an OSHA safety engineer in the audience, approached Rall at a recess and informed him that OSHA did indeed have primary jurisdiction. Shortly after the meeting, Rall shook his head and said that the committee intends "to work a little closer to OSHA in the future." Because it has toiled for so long bereft of any cooperation with OSHA and in fact developed a different proposal, however, the committee appears to have missed its opportunity to get OSHA to accept HEW's policy for federal and private laboratories.

Despite the separation between the HEW efforts and those of OSHA, there have been similar grounds for action by each group. Simply stated, they are that laboratory researchers tend to come into contact wth numerous chemicals identified as carcinogens in the course of their work. Dioxane, benzene, carbon tet-

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rachloride, chloroform, ethanol, and dimethyl sulfate are but a few of the chemicals commonly used in laboratories as reactants or solvents that OSHA has identified as potentially carcinogenic. Several epidemiological studies of chemists point up the special hazards: In one, a survey of deaths between 1948 and 1967 among members of the American Chemical Society (ACS), National Cancer Institute scientist Frederick Li found a significant number of excess deaths from cancer (5 percent). Li said recently, however, that "the methodology used on the study [conducted in 1969] was quite primitive" and, as a result, he intends to perform an update, which would include information on all causes of death among chemists. The ACS board of directors approved the idea on 10 June.

Two smaller studies have already shown similar results, however. An excess rate of death from cancer among chemical engineering graduates of the Royal Institute of Technology in Stockholm was found by a Swedish epidemiologist, Robert Olin, in 1976. And a British epidemiologist, John Waterhouse, found an excess number of lymphomas among members of the Royal Institute of Chemistry who died between 1965 and 1975.

The reaction of the ACS to these findings has not been one of great concern, acknowledged Robert Newman, director of the ACS department of professional relations. "The Li study never attracted much attention," he said. Halley Merrell, ACS staff liaison to its committee on chemical safety, explained that the reason "is that we haven't identified yet how best to attack the problem. We have testified on various proposals on Capitol Hill, distributed a manual of safety for academic labs, and generally supported educational efforts in this area." But, as both he and ACS president Anna Harrison indicated, the society has in the past responded to the proposals of others rather than taken the initiative itself. Alan C. Nixon, past president of ACS and something of an advocate of laboratory safety, offered an explanation: "The attitude of many chemists is macho when it comes to laboratory hazards, which are looked on as natural adversaries. Academics, in particular, have a hang-loose approach. Safety procedures are regarded as something that interferes with academic research, and anything that does that is bad."

Into this void of activity, then, have stepped OSHA and HEW. Some of the regulations developed by the two groups are similar. Both HEW and OSHA would require the use of respirators under certain circumstances; both also would require the provision of restricted areas, showers, protective clothing, and isolated lunchrooms. Both would require preemployment and periodical medical examinations, provided at no cost to the employee; both also would require the maintenance of medical records for long periods of time. According to testimony at the recent HEW hearing, most of these requirements are standard procedure at the most up-to-date laboratories now, although Robert Alberty, dean of science at MIT, has challenged this assertion.

Where OSHA is at odds with researchers and HEW's committee is over the monitoring devices. OSHA plans to set limits of exposure to carcinogens at the lowest feasible level, or at a minimum, a level low enough to eliminate acute and chronic noncarcinogenic effects. To ensure compliance, the agency would demand that representative worker exposures be monitored over an 8-hour period; readings of the charcoal tubes would have to be taken on either a monthly or quarterly basis for each carcinogen present in the air an employee breathes. The HEW committee, in contrast, would not require any monitoring. Instead, it has proposed that all work with carcinogens be done at a minimum under a laminar-flow safety device, and for the more potent or easily aerosolized carcinogens, under a laboratory hood device or in a glove box. Potency and relative hazard would be set out in a series of monographs now in preparation by the committee. Again, testimony at the hearing suggested that most of what HEW has proposed is now fairly standard procedure.

Laboratories, of course, are not the first institutions to plead for special relief from the OSHA proposal on the basis of costs. What distinguishes these claims from the entreatments of others, OSHA officials agree, is the obvious difference in the scale and means of operation between labs and commercial chemical manufacturers. As several scientists pointed out in letters to OSHA, the quantities usually used in a lab range from a microgram to a gram of solids and from a microliter to a liter of liquids—

Institute of Medicine Elects Members

The Institute of Medicine has elected 39 new members, bringing total membership to 359 men and women representing the social and behavioral sciences, law administration, and engineering, in addition to health and medicine. Those elected are:

Joel J. Alpert, Boston University School of Medicine; **Stuart H. Altman,** Brandeis University; **Richard C. Atkinson,** National Science Foundation; **Robert M. Berne,** University of Virginia School of Medicine; **Derek C. Bok,** Harvard University; **Stuart Bondurant,** Albany Medical College; **Orville G. Brim,** Foundation for Child Development; **Robert N. Butler,** National Institute of Aging; **William M. Cowan,** Washington University, St. Louis; **Andrew D. Dixon,** University of California, Los Angeles; **Harriet P. Dustan,** University of Alabama Medical College, Birmingham; **John W. Farquhar,** Stanford University School of Medicine; **William H. Foege,** Center for Disease Control; **Christopher C. Fordham III,** University of North Carolina School of Medicine, Chapel Hill; **Fred I. Gilbert, Jr.,** Pacific Health Research Institute; **Jere E. Goyan,** University of California, San Francisco; **Ruth T. Gross,** Stanford University School of Medicine; **Laurie M. Gunter,** Pennsylvania State University; **Samuel B. Guze,** Washington University.

Beatrix A. M. Hamburg, Alcohol, Drug Abuse, and Mental Health Administration; **Jean L. Harris,** Secretary of Human Resources, Commonwealth of Virginia; **Ada K. Jacox,** University of Colorado, Denver; **William J. Kinnard,** University of Maryland, Baltimore; **Robert S. Lawrence,** Harvard Medical School; **Ingeborg G. Mauksch,** Vanderbilt University; **Jack H. Medalie,** Case Western Reserve University; **Gilbert S. Omenn,** Office of Science and Technology Policy; **David P. Rall,** National Institute of Environmental Health Sciences; **Uwe E. Reinhardt,** Princeton University; **Lewis H. Sarett,** Merck & Co., Inc.; **Jarvis E. Seegmiller,** University of California, San Diego; **Maxine F. Singer,** National Cancer Institute; **Charles C. Sprague,** University of Texas Health Science Center; **Samuel O. Thier,** Yale University School of Medicine; **Alvin J. Thompson,** University of Washington; **Arthur C. Upton,** National Cancer Institute; **James A. Vohs,** Kaiser Foundation Health Plan and Kaiser Foundation Hospitals; **Patricia M. Wald,** U.S. Department of Justice; **I. Bernard Weinstein,** Columbia University School of Public Health.

The following were elected to senior membership:

Leona Baumbartner, Harvard Medical School; **Oliver Cope,** Harvard Medical School; **Matilda W. Riley,** Bowdoin College; **Reidar F. Sognnaes,** University of California, Los Angeles.

both many orders of magnitude below the quantities used by chemical firms or by commercial industry. Anson Keller, the OSHA attorney directing the carcinogen policy review, noted also that the frequency and variety of use are different: "We're sympathetic to the fact that it would be infeasible to monitor for exposure to several different substances that commonly exist in a lab, and to the fact that many of these sit on the shelf most of the time, to be opened only once a year," Edward G. Rall, the director of intramural research at the National Institute of Arthritis, Metabolism, and Infectious Diseases, suggested a further distinction at the HEW hearing: "OSHA has proposed considering a substance carcinogenic if it is shown to be so in two animal species or one animal species and a short-term test. Among the substances that would fit this category, there are great differences in danger to a lab worker, largely due to differing volatility, the availibility of solvents, and the likelihood of absorption by the skin. Benzene, for example, is clearly a more worrisome chemical than ferric oxide." OSHA's proposal, he added, would not make such distinctions. Finally, several others, including ACS president Anna Harrison, have made the point that laboratory workers possess a special awareness of the chemical hazards with which they must cope and thus require less regulatory direction.

Toxicologist Grover Wrenn, OSHA's director of health standards, says he is sympathetic to most of these points, although "just because an employee is highly trained does not make him immune to the effects of exposure to carcinogens." As of now, the agency officials are willing to commit themselves only to the declaration that "OSHA has

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Glaser Seeks $200 Million for Orbiting Power Plants

"Some people call us an aerospace lobby," Peter Glaser said the other day, "but that's about the farthest thing from what we are." The Sunsat Energy Council, of which Glaser is the president, is a nonprofit educational organization that seeks to promote the cause of solar-powered, electricity-generating satellites. These satellites would collect sunlight while in synchronous orbit above the Earth and beam down microwaves to receiving antennas, which would convert the energy to electricity for commercial use.

It is a rather specialized cause, but not without influence. Glaser is a vice-president of the Arthur D. Little Company and a 25-year veteran in the campaign to have his solar satellite concept given serious attention by the government. It may be gaining ground. The founding of the Sunsat Council in Washington, D.C., last March suggests that the government has now invested enough capital in the idea to need the kind of ready and expert guidance in spending its funds that Sunsat is eager to provide.

Sunsat, based in the Watergate building, has retained as legal counsel former Senator Frank Moss, who was chairman of the Senate Committee on Aeronautical and Space Sciences. Moss is experienced not so much in the bookish as the pragmatic side of law. Other members of Sunsat's executive group are such solar power enthusiasts as I. Grant Hendrick of Grumman Aerospace, Max Johnson of Westinghouse Electric, David Keller of General Electric, Arthur Kantrowitz of Avco Everett Research Labs, Ralph Nansen of Boeing (who does public relations for Sunsat), and others from aerospace firms and universities.

A bill that Sunsat members endorsed, giving $25 million in fiscal 1979 to the Department of Energy and NASA for solar satellite research, nearly passed Congress this fall. It failed at the last moment, on 5 October, largely because environmental lobbyists raised strong objections to it and persuaded a handful of senators to bring their doubts before the Senate Energy Committee, which was considering the bill. Garry DeLoss of the Environmental Policy Center, leader of the opposition, called the proposal "pork barrel in the sky."

DeLoss pointed out that, in order to meet the test of economic value, the satellite's promoters have achieved economies of scale by stipulating that 100 of these power stations will be launched in the next 30 to 40 years. This requires $40 to $80 billion in front-end research and development money, the design and production of two new types of space vehicle to carry material, a factory in space manned by several hundred workers, a new launch site other than Cape Canaveral that could manage four or five landings and launchings each day, and 100 receiving antennas on Earth covering 30 square miles each. DeLoss objected most strongly to the loss of local control over utility construction and pricing decisions that a massive 30-year plan like this one implies.

Glaser, for his part, feels harried by something akin to religious fanaticism. The opposition to his proposal, he said, is "a tyranny" because it seeks to prevent research on ideas that it dislikes. Asked why the $15 million already approved for solar satellite research was not adequate, Glaser said that this amount was "too low for visibility." He would like to see at least $200 million spent over the next 5 years—putting satellites "on a par with windmills." He expects the next Congress will be more generous than the 95th.

China Shops for American Satellite

While joint space efforts with the Soviets are in decline since the Apollo-Soyuz mission, the United States is preparing to share space technology with the government of Communist China. According to a recent report in the Associated Press, the Carter Administration has now told the Chinese that they will be allowed to buy an American communications satellite system. A spokesman for the National Security Council refused to give any details on the sale, other than to say that discussions with the Chinese proceed apace. He did not deny the accuracy of the AP story. A second official took issue with the suggestion that the Soviet Union would react negatively to the sale. "There might be some negative propaganda," he said, but he doubted that the Russians would be seriously aggrieved.

The Pentagon has not been asked yet to review the strategic importance of the sale, and indeed, it may never be. According to an official with firsthand knowledge of the project, the satellite will not be considered a strategic item in any formal sense. "Given our knowledge of the base sites," and knowing the limitations of the satellite, he said, there can be no

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no intention of interrupting the handling of carcinogens by research laboratories in a reasonable fashion," as voiced by David Bell, the agency's director of technical support.

In considering the possibility of an exception, Wrenn said he was vexed by the difficulty of isolating research laboratories from other small users of carcinogens in a manner that would withstand judicial challenge. According to Wrenn, however, if a special provision in the cancer policy is made for labs, an alternative to singling them out legally may be to make the language of the regulations sufficiently flexible so that organizations such as laboratories that use chemicals in small concentrations may avoid undue costs. In 1974, OSHA accomplished much the same objective by exempting from its standards any chemical mixtures containing less than 1 percent of the carcinogens.

Wrenn said that HEW "might be a convenient forum for developing rules on occupational exposure to carcinogens in laboratories because it's such a highly regarded institution," but acknowledged that, up to now, no thought had been given to using that forum. After the HEW hearing, Wrenn said he would probably write the HEW committee a letter and then go sit down and talk with them.

A sticking point that could prevent HEW's rules from filling the gap left by an OSHA exemption for labs is the intention of HEW not to monitor or enforce its rules, offering them instead for adoption or adaptation as laboratories see fit. Whether or not this will be a factor in OSHA's decision will become apparent in the next few months; Wrenn says the agency is determined to promulgate a final standard before the year is over.—R. JEFFREY SMITH

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doubt that this is a "bona fide civilian system." Some observers speculate that the satellite could be used to improve Chinese military communications, particularly with outposts along the Russian border. But the U.S. export license, according to this official, will specify that the satellite is to be used only for civilian communication and for educational purposes.

Congress Drops HEW Plan to Control Hospital Budgets

America's hospitals slipped from the yoke that the Carter Administration fashioned for them this year when the hospital cost containment bill died in the House Ways and Means Committee on 14 October. In its original form, the bill put spending limits on all major hospitals in the United States, allowing each an annual budget increase of no more than 9 percent. Hospital budgets increased by more than 15 percent in 1977.

The control plan was never very popular among physicians, hospital administrators, hospital owners, labor union leaders, or state health officials. "There were problems getting a constituency for it," was the mild explanation given by Grant Spaeth, deputy assistant secretary for health legislation at the Department of Health, Education, and Welfare (HEW).

To smooth the way in Congress, the bill's advocates made changes during the debate that let some interested parties off the hook. Representative Dan Rostenkowski, who chairs the Ways and Means subcommittee on health, suggested that the hospitals be put on trial for a couple of years and given a chance to meet the bill's anti-inflation goals without having government clamps applied. This voluntary plan was warmly embraced by the hospitals, for it offered an alternative to the dreaded reign of federal bureaucrats.

According to the Rostenkowski plan, the hospitals would automatically bring federal regulators down on their head if they failed to meet the voluntary objectives. The Administration agreed to this compromise, and it also agreed to exempt hospital workers from the controls. This pleased the unions. Small hospitals with fewer than 4000 admissions a year were exempted as well. These and other last-minute tinkerings softened the bill sufficiently to make it acceptable to a majority of the Senate. It passed in a surprise vote on 12 October. This action briefly revived HEW's hopes of winning a symbolic victory for controls. But in the final hours of the 95th Congress, the Ways and Means Committee would not consider the Senate bill. At this point, HEW's strategists gave up for the season. They concluded that it would be better to lose honorably than to skirt the committee, force a vote on the House floor, and risk the future wrath of offended committee members.

The exercise had an impact, however. The mere prospect of having HEW Secretary Joseph Califano installed as bursar was enough to set the hospitals on a feverish campaign of self-reform. The American Hospital Association, along with some fellow groups, created an official "Voluntary Effort" program to reduce costs. According to the AHA, the rate of inflation in costs has declined as a result—from 15.6 percent in 1977 to 12.8 percent this year. The American Medical Association has joined in, too, by asking physicians to slacken the rate of acceleration in fees to no more than the rate of increase in the consumer price index.

NAS to Select Scholars for China Exchange Program

The National Academy of Sciences is inviting American scholars in Chinese studies to apply for ten government-financed fellowships that will pay for living and studying in China for the next year. As part of the technological exchange program negotiated by White House Science Adviser Frank Press, the United States will send seven students to China for a year beginning next January, and three more for a shorter term beginning in the spring. Because the program is being put together as rapidly as possible, the deadline for application is early—13 November.

Pierre Perrolle, a spokesman for the Committee on Scholarly Communications with the People's Republic of China, said that two types of fellowship are being offered. The first seven will be for American graduate students or recent Ph.D.'s, preferably with 3 years of training in modern Chinese, who want to spend a year studying the language or taking courses at Chinese universities. The second three will be for senior scholars in "any of the sciences" who would like to do research in China for 3 to 12 months. There is no formal language requirement, but there is the caveat that work must be done within the present Chinese academic framework. "In other words," Perrolle said, "you can't go interview all the members of the politburo."

—Eliot Marshall