gime" whereby reprocessing facilities and breeders would be tolerated in major nonnuclear industrial countries such as Japan and West Germany but not in most developing countries. He also speaks of the emphasis placed by current policy on "multinational facades," an allusion to fuel cycle facilities that would be run by multinational entities. Such arrangements he regards as illusory, in part because the host country might take the facilities over, but more particularly because the plutonium contained in the mixed oxide fuel produced by them could be easily extracted.

Rowen and Wohlstetter conclude that a "precise, high-level public statement of U.S. policy on the nuclear fuel cycle has now become badly needed." They say that the backward shift in policy "seems to be occurring without a review at the top of the government."

According to one observer, implementation of U.S. policy is in the hands of officials who must deal with balky foreign governments that have resisted the hard-line approach as one that conflicts with their hopes of achieving greater energy independence and wounds national dignity. Having been put in the role of negotiators, the U.S. officials are said to want a policy that allows them room to negotiate.

Rowen may be in a position to promote the undertaking of a high-level review and lift it above the context of INFCE studies which he and Wohlstetter apparently feel are pointing toward a continuing relaxation of nonproliferation policy. He is chairman of a group of academic and other nongovernment advisers to DOE's Nonproliferation Alternative Systems Assessment Program (NASAP).

Along with some like-minded colleagues in this group, Rowen can argue his point of view directly with DOE, NSC, the Arms Control and Disarmament Agency, and the State Department. Some key officials from these agencies are expected to be present when this advisory group meets in early October.

The House Committee on Foreign Affairs, which had a big part in writing the Nonproliferation Act of 1978, also expects to take up in October the question of U.S. policy on the nuclear fuel cycle and nonproliferation. The committee staff has reviewed the Rowen-Wohlstetter report and will set up a hearing or forum to bring together before the committee members some of the principal Administration officials and independent specialists on nonproliferation policy, such as Pickering, Joseph S. Nye of Harvard, Rowen, and Wohlstetter.

One major aspect of the disagreement over nuclear fuel cycle and nonproliferation policy has to do with the extent to which nuclear power is linked to the development of nuclear weapons. Some people think that the possible diversion of sensitive nuclear materials from fuel cycle facilities associated with power generation is far less likely than the possibility that some nonweapon countries may establish facilities for the sole purpose of producing the plutonium or high-enriched uranium needed for nuclear bombs.

The Ford study says:

> For most countries that might be interested in producing enough material for a few weapons, the case for building small enrichment or reprocessing plants or both, rather than building commercial facilities, will be . . . strong. This is because economy of scale arguments suggest that enrichment and reprocessing will be commercially attractive only for plants costing a billion dollars or more and capable of servicing dozens of reactors. Small plants for a modest weapons program would, in contrast, cost perhaps a tenth as much.

The study acknowledges, however, that a nation having the elements of a power program "might elect to use them for weapons purposes." In fact, it alludes to India's building a pilot-scale reprocessing facility that was said to be associated with its civilian nuclear power program, but which produced the plutonium that was used to make the bomb that India detonated in 1974.

The Rowen-Wohlstetter study asserts that, over the last 3 years, all of the legs to the argument that the connection between the fuel cycle and proliferation is slight have been cut off, including the idea that the plutonium from a power reactor is denatured to the point that it cannot be used reliably in a weapon.

Another major aspect of the disagreement over nonproliferation policy has to do with the economics of breeder reactors as an energy source that might come into use perhaps late in this century or early in the next. For example, the Ford study points out that, while the United States may have such an abundance of uranium and other energy resources that breeders will not be needed until well into the next century (if then), less richly endowed nations find reprocessing and the breeder attractive. Although the study does not attempt to make an economic case for the breeder, neither does it dismiss the possibility that the breeder may be a serious energy option for some countries.

The Rowen-Wohlstetter study, on the other hand, suggests that within 2 or 3

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Eli Lilly Agrees Not to Monopolize Insulin Market

Eli Lilly & Co., which is considered to hold the lead in the production of finished insulin through techniques of recombinant DNA, has agreed under federal duress to license its know-how to any U.S. company that asks, and at no profit to itself. The agreement was reached with a regional office of the Federal Trade Commission (FTC) several months ago but was not announced until 19 September—after the Washington office gave its tentative approval.

Lilly agreed to license its past and future insulin technology after the FTC gathered evidence that Lilly has conspired for 27 years to monopolize the finished insulin market through exclusive licenses from firms holding key production patents, and through a lock-hold on the domestic supply of animal pancreases. The glands, which are sold by 1500 U.S. slaughterhouses, are necessary to produce insulin salt-cake and crystal precursors to the finished product.

According to the FTC, Lilly monopolized the market by ensuring that each slaughterhouse received only one bid for the glands—a bid that Lilly controlled through its arrangement with a handful of brokers and collection companies. This had the effect of eliminating competition, holding down costs, and ensuring a healthy profit from sales to insulin-dependent diabetics. Lilly allegedly enforced the conspiracy by cutting miscreant collection and brokerage firms out of the market through high bids and other devices. It dissuaded one firm, the Armour Pharmaceutical Company, from direct competition by buying up large quantities of its crystals and salt cakes, the FTC says. Lilly now shares the entire U.S. market with only one other firm, E.R. Squibb & Sons, Inc., and accounts for 85 percent of all domestic insulin sales (approximately $48 million in 1976).

Lilly, for its part, enters what is in effect a plea of nolo contendre; it signed the FTC order without admitting guilt merely to "avoid protracted and costly hearings and litigation." The company believes that its activities were responsible and lawful, states a public relations announcement. But FTC

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lawyer William Holmes, who worked on the case for 2 years, says that the agency has "documentary evidence to substantiate all of the allegations in our complaint." A $15 million civil suit, filed by the By-Prod Corporation of St. Louis, is still pending against Lilly and the others allegedly participating in the same conspiracy.

The result of the agreement is that Lilly will have to license to others its sole rights to worldwide marketing of human insulin made with recombinant DNA techniques by the Genentech Corp. of San Francisco. Genentech, which has been partially funded by Lilly, was the first to announce successful synthesis in September 1978. Since then, the two companies have been cooperating to scale up for mass production.

Worse News About PCB's

Bad news about contamination of the environment by polychlorinated biphenyls (PCB's) came in triplicate last month. Most serious was the belated discovery by federal food authorities that PCB's had leaked from an electrical transformer at a packing company in Butte, Montana, into animal feed the company then sold throughout at least nine western states. PCB's have been linked in laboratory animals to cancer and birth defects and in humans to endocrine and nervous system disorders.

Authorities have destroyed at least 35,000 pounds of contaminated chicken parts so far, along with 1 million eggs and $250,000 worth of strawberry cakes. Levels found in the eggs were in the range of 0.6 ppm; in the chicken, 5 ppm; and in the feed itself as high as 2000 ppm. In a 1968 poisoning incident in Japan, a level of 6 ppb in humans was thought to have deleterious effects.

The other news came from the recent symposium of the American Chemical Society in Washington, D.C. Researchers there presented evidence that PCB's are being transported through the air into lakes and streams in great quantities, and that by-products of PCB's, known as polychlorinated dibenzofurans and thought to be up to 500 times more toxic than PCB's, have been discovered in fish in numerous locations.

Postscripts

Directors of the congressional **Office of Technology Assessment** (OTA) have been busy the last 2 weeks hurriedly spending nearly $1 million in funds from the 1979 fiscal year, which ended October 1.

According to several senior staff members, they were told on 17 September by OTA director Jack Gibbons and budget director Tom McGurn that an economic surplus with great proportions loomed on the horizon. Unless everyone went out and distributed contracts, the agency's excess funds would revert to the U.S. Treasury. Federal agencies traditionally avoid this embarassment, as it provides penurious Congressmen with justification for appropriating less money the following year.

Last week, contracts were let in topics ranging from alternative energy futures and global energy trends to applied genetics and the cost-effectiveness of medical research. "Very few grants are being distributed on a competitive basis," an OTA official said last week. "Everybody was urged to process applications as swiftly as possible, so most of them were sole-source" (single bids).

McGurn denies that the agency was "year-end spending." "Each of the 30 recently-let contracts was planned and in the works for a long time," he says. "The contracts were all pending, but they were not far enough along in the process."

As may be recalled, OTA directors announced in July a possible shortfall of $1.8 million and the firing of 23 OTA staffers as an economy move (*Science*, 10 August). McGurn says that reductions in the agency's commitments back then "have put the agency's budget and obligations into balance so we can zero-out now."

• The federal government has dropped entirely its efforts to suppress **an article written for *Progressive* magazine on the workings of the H-bomb.** The Justice Department made its decision on 17 September after a newspaper in Madison, Wisconsin, the home of the *Progressive*, published a similar article written by a California computer scientist, Charles Hansen.

The government had initially alleged the *Progressive* piece would reveal bomb details vital to national security (*Science*, 30 March), but was quickly embarrassed by a discovery that similar information was available on public shelves at the Los Alamos National Scientific Laboratory. With the publication of Hansen's letter, Justice Department attorneys decided that continued court action against *Progressive* would be pointless.

Hansen's description of the bomb was contained in a letter ostensibly written to Senator Charles Percy (R-Ill.), but sent, in addition, to several newspapers. In it, Hansen claimed that Edward Teller, the bomb's original designer, and two other scientists, Theodore Taylor of Princeton and George Rathjens of MIT, had already disseminated vital H-bomb data. Teller was cited for an entry he wrote in *Encyclopedia Americana*, and Taylor for information he gave to John McPhee, author of *The Curve of Binding Energy*. Both scientists, who participated in the government's efforts to suppress the *Progressive* piece, denied Hansen's allegations.

Hansen claims to have written the H-bomb description entirely from research in public libraries and research centers. He reportedly has clearance to classified materials, but claims not to have used it. Federal attorneys have expressed skepticism, and even suggested that scientists at the Livermore and Argonne national laboratories who supported the *Progressive*'s case may have leaked information that formed the basis of what Hansen wrote.

• The **Westinghouse Corporation** has lost its suit against the Nuclear Regulatory Commission (NRC) in an effort to gain a license for the export of nuclear reactor components to the Philippines. In a brief decision on 30 August, U.S. District Court Judge June Green decided the NRC's prolonged deliberation over the license application had been neither arbitrary nor capricious.

The NRC has been delaying approval of the license while several federal agencies analyze the peculiar hazards of the reactor's location at the foot of a volcano (*Science*, 31 August). In defending itself against the suit, the NRC delighted environmentalists with public assertions that it has "a clear interest in insuring that the world's nations carefully evaluate activities taken under their authority."

R. Jeffrey Smith