viduals who might die from a specified level of exposure to various toxins. Then regulators must decide how to intervene—if at all—by weighing the costs and benefits of regulations for industry, workers, and the public. These cold, analytical methods dismay many Americans. Industry leaders and some scientists, on the other hand, argue that scientific knowledge has not advanced far enough to make firm judgments possible.

Ruckelshaus would alter the EPA's role, leaving it with the power to set broad national pollution standards that would be applied by local government. That would reduce the dangers of excessive, abstract regulations while giving ordinary people a voice in deciding what risks they are willing to bear.

Deadly Fibers

"Asbestos: The Fiber That's Panicking America" by Pamela S. Zurer, in *Chemical and Engineering News* (Mar. 4, 1985), 1155 16th St. N.W., Washington, D.C. 20036.

To the touch, asbestos—a fibrous, fireproof mineral—is soft and inviting. But this insulator has stirred widespread alarm because of its latent carcinogenic properties.

Zurer, an editor at *Chemical and Engineering News,* believes that the asbestos "crisis" stems from ignorance. Long used for electrical insulation, building fireproofing, and auto brake linings, asbestos since the 1960s has been linked by scientists to fatal lung diseases (chiefly asbestosis and mesothelioma). These findings spurred the U.S. Occupational Safety & Health Administration to regulate airborne fibers in workplaces in 1971, encouraged workers sick from exposure to file lawsuits in 1982, and alarmed ordinary citizens over asbestos in their offices, homes, and schools during the last year.

In 1984, Congress gave the U.S. Environmental Protection Agency (EPA) $50 million to help local school districts inspect their facilities for friable, uncovered insulation. The EPA estimates that 15 million schoolchildren and tenants in some 700,000 private and commercial buildings have been exposed. School officials and landlords nationwide are now hurrying to remove the insulation for fear of future lawsuits. Yet, Zurer points out, no one knows exactly how hazardous low-level exposure is. And sloppy removal can worsen the situation by blowing asbestos fibers into the air.

Asbestos is dangerous only when fibers of a specific size are inhaled and stick in the respiratory tract. The body can expel most fibers, but those remaining have been shown to irritate lung tissues and provoke cancers. The greatest unknown is asbestos's "threshold level" of exposure—the maximum amount that can be inhaled without causing illness. Some researchers say there is no safe level; others say that no one has found it. One obstacle is incomplete data. The relevant lung diseases may be latent up to 30 years, but accurate records of workers' exposure go back only to 1972. Thus, the risks of low-level exposure must be extrapolated from data on high-level exposure. To make matters worse, many different mineral compounds bear the label "asbestos," each with a different level of toxicity.

Not surprisingly, scientists have been unable to produce universal safety guidelines. The price tag for removing all asbestos from the nation's schools and office buildings: an estimated $20 billion. Zurer doubts that such extreme measures are necessary, or even practical —especially since wary insurance companies are refusing to cover contractors who do this work.

Reassessing Nuclear Meltdowns

"Assessing the Effects of a Nuclear Accident" by Colin Norman, in *Science* (Apr. 5, 1985), 1515 Massachusetts Ave. N.W., Washington, D.C. 20005.

Six years after its near "meltdown," Three Mile Island (TMI), the nuclear power plant in Harrisburg, Pa., is still synonymous with disaster in the public mind. But to many nuclear scientists and engineers, what did *not* happen at TMI is more interesting than what did, spurring a reassessment of nuclear accidents in general.

Following the TMI mishap, observes Norman, an editor at *Science*, scientists were surprised by the absence of radioactive iodine in the environment surrounding the stricken nuclear plant. Previous meltdown models predicted the formation of an iodine vapor cloud, which is potentially fatal and difficult to contain. However, as Norman notes, "it is now widely accepted within the nuclear research community that the chemistry underlying the earlier predictions was faulty."

Studies of TMI by the American Nuclear Society (ANS), the Industry Degraded Core Rule-making Program (IDCOR), and the American Physical Society (APS) showed that U.S. reactor containment vessels can withstand pressures twice as high as the design indicates. They also found that more radioactive particles stay inside the plant—instead of escaping—than was expected. Airborne fission products stick to walls, equipment, and pools of water.

Both the ANS and IDCOR favor reducing the "source term"—estimates of radioactivity released during an accident. But the APS researchers caution against "sweeping conclusions." They warn that tests of containment vessels are far from conclusive and that many chemical reactions which occur during a meltdown are not well understood. In addition, the United States (unlike France) has no single, standardized nuclear power plant design, which means that hazards could vary greatly from site to site.

The nuclear power industry now wants the U.S. Nuclear Regulatory Commission to change some regulations based on these new findings. But because the prestigious APS refuses to endorse the more optimistic conclusions of the other two groups, Norman reports, the NRC is not likely to oblige. Too many questions remain, and the APS says that four more years will be needed to answer them.