sition that prompted considerable grumbling from diehard U.S. test ban opponents. No single view has yet prevailed, and the Conference, which operates by consensus, remains immobilized.

Some verification experts, such as Milo Nordyke at Livermore, are pessimistic that the remaining U.S.–Soviet differences may be easily resolved. The Soviets may not agree to search for 25 extremely quiet seismic sensor sites, he says. They might insist on a total test ban, not merely a limit of 1 or 2 kilotons. They might also oppose an indefinite moratorium on peaceful explosions. Shustov, of the Soviet Union, is vague about potential compromises on these topics, indicating only that "if the Western side were ready to finalize bilateral negotiations, we would be ready to go along." Actually, he says, "in this venture, we are ready to have bilateral, trilateral, or multilateral exchanges. All the talks about the complexity of verification are artificial ones. Our scientists are convinced that it is possible to verify a [comprehensive test ban], and there are no insurmountable difficulties about this."

He suggests that the Soviet Union would be willing to renew the negotiations even if Reagan declines to seek Senate ratification of the related Threshold Test Ban Treaty and the Peaceful Nuclear Explosions Treaty. "In my position it is difficult to give you a direct answer," he told *Science* recently. "But two things I can tell you very definitely. First, we would like to use all means for reaching an agreement on a comprehensive test ban. If there were sound proposals on the other side . . . and if they appeared to facilitate an agreement, I think we would view them positively. Second, we consider the ratification of what is already agreed upon to be useful." But he hints that the Soviet Union will oppose further activity by the Conference on Disarmament's scientific group if negotiations do not occur soon. "If the scientific discussion and experiment are used as a substitute for negotiation and agreement, then certainly this situation will be unacceptable," he says.

Clearly, the Soviet Union's commitment to a treaty will be measured in part by its performance in the ongoing experiment. Alewine is not encouraged by the fact that data are being sent by only one Soviet station, and that it somehow failed to pick up seismic signals generated by two Soviet nuclear explosions in late October. But a final assessment of their participation must await the next international meeting of the scientific group in March.

In the meantime, the test ban issue will probably attract renewed political attention. On the last day of the 98th Congress, Representative Dante Fascell (D–Fla.), the House Foreign Affairs Committee chairman, excoriated the Reagan Administration for withdrawing from the negotiations and announced that he intends to conduct a series of hearings on the test ban next spring. Representatives of nuclear freeze groups have also stated that a test ban will be at the top of their agenda next year.

Since the termination of formal negotiations, virtually the only activity in this area has been scientific, and most of the participants believe that their efforts have borne fruit. Hans Israelson, the delegate from Sweden to the Conference on Disarmament's Ad Hoc Group of Scientific Experts, says that treaty verification is no longer an indecipherable problem. "It is a political issue," he says. "It hangs on whether you'd like to have the opportunity to test." Only when both sides agree to forgo this opportunity will a treaty finally be reached.—**R. JEFFREY SMITH**

EPA Scraps Radionuclide Regulations

A staff proposal to limit airborne emissions of radionuclides will not be implemented; the decision is being challenged in court

The Environmental Protection Agency (EPA) recently decided to withdraw a staff proposal to regulate airborne radioactive emissions because, in its opinion, the health risks are small. Agency officials admit that the decision represents a departure from past policy regarding the regulation of public health risks, a change that has provoked unusually harsh criticism from environmental groups. The groups assert that the decision undermines the Clean Air Act and that people who live in sparsely populated areas and are exposed to high risks will not be protected. The Environmental Defense Fund has already filed a lawsuit to challenge the agency's decision.

Radionuclides are radioactive particles or gases emitted from a variety of sources, including processing plants that convert phosphate rock into elemental phosphorus, nuclear weapons plants, nuclear power plants, and related research facilities. Almost 5 years ago, EPA classified radionuclides as hazardous air pollutants and, last year, under court order, the agency proposed a set of regulations that would have required tighter restrictions on emissions. (At the same time, EPA proposed not to regulate radionuclides emitted by coal-fired boilers, plants that process phosphorus into fertilizer, and low-energy accelerators.)

Now EPA administrator William Ruckelshaus has overturned his staff's recommendation. Environmental groups argue that the decision fails to protect people who live in remote areas but are at high risk. Of particular concern are two plants in Idaho where 3000 people live in the surrounding area.

According to an agency analysis, individuals currently living near elemental phosphorus plants have an increased risk of dying from cancer of 1 in 1000. The agency proposal would have reduced the risk by three orders of magnitude, to 4 in 100,000. In the past, the agency has regulated hazards when the risk of cancer has been 1 in 1,000,000. The agency analysis says that the increased risk translates into only one case every 17 years.

An agency statement says that the "driving factors" in the decision not to regulate include "the high costs of controls versus public health benefits [and], the low aggregate risks . . . ." EPA staff estimates that the capital costs of instituting more pollution controls for radionuclides would have totaled $11 million.

The environmental groups take issue with this approach for two reasons. EPA should base its decision solely on the risk to individuals highly exposed rather than factoring in risk to the overall population, they argue. "Exposed people in sparsely populated areas deserve protection just as much as those living in big cities," says David Doniger, senior attorney at the Natural Resources Defense Council. "Protection you get from EPA

shouldn't depend on how many neighbors you have." He and others also object that cost was a consideration in the decision. They argue that the Clean Air Act mandates that regulations be developed to protect public health without regard to cost. Furthermore, the cost of regulation in this case is minor, they say.

EPA last year also proposed to revise exposure standards for facilities that are regulated by the Department of Energy and the Nuclear Regulatory Commission (NRC), but these plans have been scrapped too after an apparent jurisdictional fight. EPA would have set an exposure level to reduce the fatal cancer risk by a factor of 10 at nuclear weapons plants and halved the risk for facilities licensed by the commission.

The cost of these EPA regulations would have been negligible, according to staff estimates. Nevertheless, top energy department officials and the NRC during the past year have vigorously opposed stricter regulations, arguing that their standards were sufficient. Federal legislators from states with such facilities have also written to the agency to protest the proposal. EPA staff decline to say what role the opposing agencies played in the agency's decision.

EPA officials admit that the decision represents a departure from past policy.

The agency did announce that it would propose new standards regulating underground uranium mines, but the environmentalists were hardly heartened by the news. Brooks Yeager, a Sierra Club lobbyist, says the decision represents even further regulatory delay. "They've had 5 years to develop a standard and now there's still no schedule for a final rule. We have no confidence that they'll do anything."

The heat is still on EPA to regulate radionuclides. Environmental groups are going back to court, arguing that the agency has not lived up to a court order issued last year. The Sierra Club has filed a suit contending that Ruckelshaus acted in contempt of court. And the Senate Environment and Public Works Committee chairman and its ranking minority member wrote to Ruckelshaus, urging him to reconsider his decision. Chairman Robert Stafford (R–Vt.) and Jennings Randolph (D–W. Va.) said, "We are hard pressed to understand [your] decision . . . we do not see how a decision not to regulate at this time is consistent with requirements of the Clean Air Act. . . ."—**MARJORIE SUN**

Schlesinger Attacks Star Wars Plan

Despite an aggressive White House marketing campaign, President Reagan's plan to defend the public against nuclear missiles—popularly known as his "Star Wars" plan—continues to attract criticism from nuclear weapons experts. This, at least, was one message of a recent conference on space and national security in Bedford, Massachusetts.

A number of speakers at the conference, which was cosponsored by the Air Force and by the MITRE Corporation, a major Air Force contractor, ripped into the program and assailed the President for misleading the public in his initial April 1983 announcement about it. "The heart of Reagan's speech was the promise that someday American cities might indeed be safe from nuclear attack," said James Schlesinger, a former Secretary of Defense and arms control adviser to President Reagan. It is entirely unrealistic, he said. "There is no serious likelihood of removing the nuclear threat from our cities in our lifetime or in the lifetime of our children."

Schlesinger, who received classified briefings on the program as an adviser to the recently dissolved President's Commission on Strategic Forces, said that he doubted whether an effective space-based missile defense could actually be constructed, whether it would be affordable, and whether it would add to global stability. "Any [space] defense is going to suffer some erosion," he said, "and an effective opponent will develop defense suppression techniques and punch a hole in whatever . . . is deployed. . . . Even if we were able to develop a hypothetical leakproof [missile] defense we must bear in mind that there are means of delivering nuclear weapons other than nuclear missiles. I point this out because the United States Air Force has long argued that air defense systems are penetrable." Schlesinger added that the cost of a defensive missile shield would be at least $1 trillion, and that its development would adsorb funds drastically needed by conventional weapons programs.

He noted, however, that continued missile defense research is important, as did virtually all of those attending the meeting. He said that a number of recent Pentagon studies have indicated that a mixture of defensive and offensive weapons can indeed enhance global stability. But "all of these studies rest upon an assumption" that the number of offensive weapons will be constrained at the same time a missile shield is deployed, and it is unlikely that the Soviet Union will agree to such contraints so long as the United States is endeavoring to build the shield—a consummate Catch-22. Finally, Schlesinger said that talk of abandoning nuclear deterrance based on offensive weapons because of its alleged immorality is "reckless," "immature," and "pernicious." "We are going to rest on [this policy] for the balance of our days," he said.

Somewhat less strident criticisms were also voiced by Abram Chayes, a Harvard law professor; Albert Carnesale, academic dean at the John F. Kennedy School of government; and Richard Garwin, a physicist at IBM. Retired Lieutenant General James Stansberry, a former commander of the Air Force Systems Command, gently criticized the program for its failure to have a concrete goal. "I've seen a lot of people spend a lot of money over time, when people didn't know quite what they were up to," he said. He added that the tough questions about the program "haven't been debated enough."

At the meeting, both Lieutenant General James Abrahamson, the director of the missile defense program, and Gerald Yonas, its chief scientific adviser, consciously downplayed any hopes of using it to defend cities. Abrahamson acknowledged that "there is no perfect weapons system, there is no panacea," and Yonas said that the program's only purpose is to "search for technology to see if we can find an alternative to the present system. . . . our program is the President's program."—**R. JEFFREY SMITH**