

One small step for nuclear R&D

by Marsha Freeman

On April 23-24, the U.S. Department of Energy sponsored a workshop in Washington, D.C., to brief about 100 of the nation's experts in nuclear science, engineering, and management on new initiatives the department has requested be funded in the fiscal year 1999 budget for nuclear energy research and development. The centerpiece of this effort is the Nuclear Energy Research Initiative (NERI), which would be funded at an initial level of \$24 million. Last year, Congress refused to fund a similar initiative.

NERI would fund research proposals by investigators in industry, universities, and government laboratories in fields that would lead to new technologies to improve the performance and economics of U.S. power plants, preserve U.S. leadership in nuclear technology internationally, and enhance nuclear energy's attractiveness as an energy source for the future, in the United States and abroad.

In the workshops, it was suggested to researchers that the areas they consider for submitting proposals include proliferation-resistant reactors and fuel cycles; new reactor designs with higher efficiency, lower cost, and improved safety; nuclear waste storage; and, "lower-output reactors."

"Lower-output reactors" are smaller reactors that may be more appropriate for use by developing nations. This area of work reflects the recognition that while the United States is shutting down nuclear power plants because the threatened deregulation of the electric utility industry has made them "uneconomical," developing nations, particularly in Asia, and most recently China, are planning to aggressively use nuclear energy to power their economic development. The United States has assumed that, because about 20% of its electricity is produced from nuclear energy, it is a world leader in this field. But, in fact, nuclear power now provides 17% of the electricity used worldwide; the United States is being left behind.

It has become painfully clear to the nuclear community that the refusal of their industry to fight the mindless anti-nuclear activists, starting back in the 1970s, has nearly destroyed the R&D and industrial base of what was the most extensive nuclear capability in the world. In the Reagan administration, nuclear R&D funding was considered "corporate welfare," and was emasculated. Similarly, in the Clinton administration, Vice President Al Gore has made clear his preference for "soft" energy sources, such as the recyclables, including wind and biomass.

But even in the industrially depressed United States, electricity use is increasing, and many who are planning for the energy needs of the next century know that the nuclear technology base must be kept alive to be reinvigorated. In the developing world, nuclear is the energy source of choice for the future.

The nuclear challenge for the next century

So, when, in January 1997, President Clinton directed the President's Committee of Advisers on Science and Technology (PCAST) to review Federal funding in energy research and development for the challenges of the 21st century, taking into account the environmental impact, he asked that they consider the role of nuclear fission and fusion technologies.

The PCAST report addressed three aspects of the challenge for nuclear energy in the United States. One involves the "concerns" about nuclear power—which are political hot button issues, more than technical considerations—including nonproliferation, safety, and waste from spent nuclear fuel. To address these concerns, as well as the admirable goal of designing and producing smaller reactors for developing nations, PCAST recommended that a Nuclear Energy Research Initiative be established. It recommended an initial funding level of \$50 million, to be increased to \$100 million per year by FY 2002.

The President's advisers also recommended that \$6 million per year be allocated for university programs. The number of nuclear engineering departments in universities has fallen by about half in the past decade or so, and equipment has become outmoded. Recognizing that without nuclear engineers there will be no future industrial capability, the DOE is proposing that a new Nuclear Engineering Education Research program be started this year, to reverse the trend.

Third, PCAST recommended \$10 million per year for a program to work on the problems encountered in operating U.S. nuclear power plants. This money will be matched by industry, through the Electric Power Research Institute, and will tackle questions such as component aging, in order to extend the lives of plants. One goal is to stop the premature closing of plants that can be operated safely and economically.

The budget requests for the NERI will fund small research projects, not demonstration plants. But, it is a first, small step in resurrecting a nuclear energy R&D effort.

Dr. Arthur Bienenstock, from the White House Office of Science and Technology Policy, told workshop participants that the President has often stated that "technology, and our science base, are responsible for more than 50% of America's productivity increase in the past 50 years." However, the funding for NERI is slated to come from a settlement with the tobacco companies, a funding source that is less than reliable.

How do you keep the program from suffering due to politics? he was asked. "Tell Congress the program is important," Bienenstock counseled, which is good advice.