



A NUCLEAR NEWS INTERVIEW

William Magwood: Nuclear power has “turned the corner”

On May 17, William Magwood ended his tenure as director of the Department of Energy’s Office of Nuclear

Energy, Science and Technology. Although appointed in 1998 by the Clinton administration, Magwood was retained when President Bush took office in 2001, giving him the rare experience of serving under administrations of both political parties. He previously served as associate director for planning and analysis in the same office. Prior to his government service, Magwood managed utility research and nuclear policy programs at the Edison Electric Institute and was a scientist at Westinghouse Electric Corporation, analyzing radiological and hazardous waste disposal, treatment, and handling systems.

Nuclear News Senior Editor Rick Michal had interviewed Magwood for the February 1999 issue, near the beginning of his tenure. For this new interview, Magwood answered questions submitted to him by *NN* Associate Editor E. Michael Blake; both the questions and the answers were sent by e-mail.

On the eve of his departure from the Department of Energy, the director of the Office of Nuclear Energy, Science and Technology addressed the prospects for nuclear power in the short and long term.



Magwood: “I think that we have more than made headway—I think we have turned the corner.”

Why are you leaving the DOE?

I feel that I have accomplished what I had set out to do. When I became director of Nuclear Energy seven years ago (May 8 was my anniversary, by the way), I was faced with a research program with no funding, collapsed international prestige for U.S. nuclear R&D, and a nuclear education system that appeared to be in freefall. I decided early on in my tenure that my basic goals would be to reverse those conditions. I think I have done that and more. I’m quite pleased with the state of things in the program, and I think that this is a good time to move back to the private sector—something I have been thinking about for the last year. After all, when I first came to the department, I assumed that as a political ap-

pointee I would be here only two or three years; I never imagined that I would be here for 11 years.

Do you already have another position? If so, what?

I haven’t accepted anything yet. I always felt that when I finally departed federal service, it would be best to make a clean separation before having serious discussions about new positions. My highest priority after leaving, however, is to take a break. As many of my colleagues know, I haven’t taken any time off since coming to DOE, so I guess you could consider this my vacation.

Do you believe that the DOE has made some headway toward a revival of nuclear

power in the United States?

Absolutely. I think that we have more than made headway—I think we have turned the corner. I don’t think there is any doubt now that new nuclear power plants will be built in the United States in the relatively near future.

How far should the federal government go in providing funding for that revival?

Mostly, I think we should do what we have already committed to do—fully implement the Nuclear Power 2010 program. That program represents a half-billion-dollar government commitment to help industry certify the most advanced nuclear plant technologies available and demonstrate thus-far untested elements of the

U.S. nuclear plant licensing regime. This is a big deal and a major accomplishment of which we are very proud.

Beyond that, I think the concepts the president laid out a few weeks ago represent an appropriate role for the government in moving utilities closer to ordering the next plant. As we analyzed the situation over the past few months, we've learned that many utilities believe the economic case to build new plants is either in place or very close to being in place. They also believe that the vendors can build new plants at the costs and on the schedules they are advertising. Given that, the biggest remaining problem is managing the regulatory risks associated with the unproven combined construction/operating license process. That is what the president wants to address.

Duke Power Company is exploring the possibility of building a new nuclear plant, without seeking Nuclear Power 2010 funding or the sort of tax incentives promoted by nuclear advocates. Do you think the conditions may already exist for a nuclear revival, without extra government assistance?

First, it is important to mention that as a member of NuStart Energy, Duke Power plans to benefit significantly from the work that that organization will accomplish over the next several years as the utility continues its consideration of building a new plant. But to the essence of your question, I do think that some utilities may decide to build new plants soon. I think this is particularly the case for utilities, such as Duke Power, that are in regulated utility markets, because they can manage the financial risks more effectively.

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The cost sharing sought by the consortia for plant licensing under Nuclear Power 2010 appears to include areas such as detailed design and balance-of-plant. Should the DOE share costs such as these?

To a degree, yes. The new nuclear plant designs are complete systems, and if utilities are to be able to have confidence in the cost estimates and the construction schedule, a significant amount of detailed design

and balance-of-plant work is appropriate as part of the Nuclear Power 2010 program.

If new reactors are ordered, some major components will be manufactured overseas. Does a U.S. nuclear revival depend on a return to domestic manufacturing?

I don't think we can predict that at this point. I believe that if utilities order a large number of new plants in the future—comparable to what we saw in the early 1970s—then it is quite likely that industry would invest in the manufacturing capability to make more of the components in the United States. But I think we all recognize that the overall manufacturing sector has changed a lot in the past 20 years and that some components will always be made overseas. Whatever the longer-term future holds, it seems clear that vendors will need to rely on their overseas partners to fabricate some of the components for the first few plants. Obviously, the early phases of a nuclear revival can proceed in this way, but one would like to see the U.S. manufacturing base benefit from the construction of a new family of plants.

The hydrogen initiative, and the Generation IV approach in this country, appear to depend on high-temperature gas-cooled reactors, with no apparent role for light-water reactors. Can there be a near-term revival if LWRs are seen as a dead-end technology?

Yes. Light-water reactor [LWR] technology is the best technology that exists today, and it will be around for a long time. Even if we are wildly successful in ushering in a new generation of very high-temperature reactors, the first commercial units wouldn't be

ordered for another 15 to 20 years. Also, it isn't clear that all utilities would always choose to build VHTRs [very high-temperature reactors, which would be gas-cooled] over LWRs. I think utilities will build whatever technology that they find best fits their economic plans and overall systems. If a utility decides to build LWRs in the next few years, it will be because it is a good business decision today. They

can't wait for what might show up on the market 20 years from now.

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Does nuclear power have to prove itself in hydrogen production in order to have a role in the future energy mix?

No, but I think that hydrogen is the key to a massive expansion of the use of nuclear power in the future. One of the reasons nuclear power grew quickly in the 1970s was that utilities wanted to replace petroleum as an energy source for electricity generation. It could grow even faster in the 2020s if it becomes a replacement for petroleum as the means to power our transportation sector. One of the most important factors in the future of energy in this country is our growing dependence on imported oil. We could be importing 79 percent of our oil by 2025 if nothing is done, and I think our security demands that another option become available. The president's vision of an economy based on hydrogen is, in my view, the best path to reducing our reliance on imports over the long haul. If nuclear can play a significant role in achieving that vision, its growth will outstrip anything we have seen before.

Would there be room for two technologies, with LWRs providing electricity and HTGRs [high-temperature gas-cooled reactors] producing hydrogen?

We believe that VHTRs will prove adept at both electricity generation and hydrogen production, but yes, I think there is room for both. A lot depends on how utilities eventually choose to operate VHTRs, which will be small, modular systems of around 200 MWe. LWRs are proven, reliable, baseload systems. Utilities may see advantages in a mix of systems, at least for many years to come.

Because of the statutory limit on waste volume for Yucca Mountain, would a significant nuclear revival force development of a second repository?

That depends on the choices we make regarding the recycling of spent fuel. If we embark on the recycling and transmutation of nuclear fuel, a single repository could sustain a major nuclear revival for a very long time. Otherwise, unless some other

strategy is developed, we would need to find additional repository space.

Would the potential benefits of the Advanced Fuel Cycle Initiative (AFCI; minor actinide burnup, etc.) help reduce waste volume in current and Generation III+ LWRs?

Yes, but more important, AFCI technologies would also reduce the toxicity and heat generation of nuclear waste. In a repository, heat drives the size of the facility and toxicity drives the isolation requirements. AFCI technologies could attack both problems and make the repository a better, longer-serving repository.

What do you think were your main achievements while you were in charge of the Nuclear Energy, Science and Technology Office?

I get that question a lot. I suppose that the most important thing I've done is to put the United States back into a clear leadership position in nuclear technology. The formation and advancement of the Generation IV International Forum, which I chaired for the last couple of years, has been a tremendously satisfying achievement, especially since we recently signed the world's first multilateral agreement to develop next-generation nuclear technologies. I am also proud of the careful policy work over several years that first created and later fully implemented the Nuclear Power 2010 program, which I believe will spark the construction of the first new nuclear plants since the 1970s.

But I think the thing I will reflect on as the years pass will be our success in helping universities reverse the very negative trends of the 1990s regarding their nuclear engineering programs. When I became director, DOE was spending only about \$3 million on these programs and university reactors. There were only 480 students in U.S. nuclear engineering programs. We are now investing around \$24 million, and there are more than 1500 students studying nuclear engineering. We have even launched a program to get high school students into nuclear, with a pilot course being taught in seven Pittsburgh high schools. I think the education work has been the most satisfying we have done during my tenure.

Do you think that your work at the DOE has led to greater opportunities for minorities in nuclear science and engineering?

I know it has. We have established partnerships that involve six minority-serving institutions across the country. Of the 1500 students I mentioned who are now studying nuclear engineering, about 50 are at these schools. That sounds like a small number until you remember that there were none at all five years ago. The first students have already graduated. We made a real difference in this area, and we are very proud of what we've accomplished. **■**