The nuclear renaissance: Facing the challenges, maintaining safety

BY WILLIAM CAVANAUGH III

All of the talk about a resurgence in nuclear power requires that the industry temper its current optimism with a practical consideration of the challenges that lie along the way.

NUCLEAR ENERGY MAKES an important contribution to the world's energy needs—a role that grows in importance in light of the environmental and economic issues we are facing in the world today. And so it is my goal to convey two key messages:

- First, a nuclear renaissance is under way, but fulfilling nuclear energy's promise will come with many challenges.
- Second, the benefits of nuclear power can be brought to mankind only if nuclear safety is kept at the highest possible level. Truly, without safety there is no future.

Let's begin with the nuclear renaissance. In short, nuclear power plants have proven to be good assets for the energy business. They're reliable, they have low operating costs, and the fuel is abundantly available from geopolitically stable sources.

After many years of being out of favor, nuclear power is finally experiencing a rebirth, a renewal. Everywhere we look there are headlines about a global nuclear renaissance. Last summer, a lengthy article about nuclear energy was printed in the respected magazine *The Economist*, which noted, "Climate change is helping a revival of the nuclear industry."

Earlier in the year, the high-tech magazine *Wired* ran an article titled, "Nuclear now! How clean, green atomic energy can stop global warming." The journalist reported that "some of the world's most thoughtful greens have discovered the logic of nuclear power, including James Lovelock, . . . Patrick Moore, a cofounder of Greenpeace, and Britain's Bishop Hugh Montefiore, a longtime board member of Friends of the Earth."

I imagine that our colleagues from Asia find news of a "nuclear renaissance" somewhat ironic, since the construction of nuclear plants in that region has been steadily increasing for many years, and this will continue in the decades to come.

For example, China has an ambitious construction program and expects to have 40 GWe of nuclear capacity on line by 2020. India has a flourishing and largely indigenous nuclear power program and expects to have 20 GWe of nuclear capacity on line by 2020.

In other parts of the world, evidence of renewed interest in nuclear energy is widespread:

- A 1600-MWe European Pressurized water Reactor, or EPR, is being built in Finland.
- Construction of a 1600-MWe EPR in France is expected to start in 2007.
- The Russian Federation plans to double its nuclear capacity by 2020.
- The Ukrainian government plans to build as many as 11 new reactors by 2030.

And in the United States, a national energy policy is now in place that improves the prospects for new nuclear plants. Several U.S. electric utilities have indicated an interest in seeking an early site permit for a new reactor or a combined construction and operating license.

I could continue with examples from—quite literally—every corner of the globe. But this nuclear renaissance is fragile. No matter how sound the economic and environmental arguments for nuclear power, they count for little without the support of the general public and the political decision-makers. And neither of these groups is strongly convinced about the wisdom of a future role for nuclear energy.

Look no further than the bans placed on the use of nuclear power in Austria, Denmark, and Ireland; and the phaseout laws in Belgium, Germany, and Sweden. These have come about as a result of public fears and political pressure. At the root of this opposition are doubts about safety. And one word sums up the public's worst fears about the perceived dangers of nuclear energy: Chernobyl.

But there are some in our industry who do not believe another nuclear accident is possible. There are others who do not believe that another accident would have an impact on our nuclear renaissance. Let me be very clear about my opinion on these points:

- No matter how much we have improved over the years, an accident is always possible. To think and to act as if it were not only increases the likelihood of an accident's occurring.
- If another accident does occur, it will undo all the good work of recent years, and it will postpone the nuclear renaissance for another 15 or 20 years. It takes a long time to build credibility, but a single moment for it to evaporate. In this industry, there is no margin for error, no positive bank account of goodwill.

As Hans Blix, the former director general of the International Atomic Energy Agency, said, "Only the prolonged, relatively problem-free operation of nuclear power plants will dispel misgivings about the use of nuclear power."

With that as a backdrop, I will now move on to some of the challenges to nuclear safety that our industry faces—challenges that will require our combined efforts to overcome.

First, many new plants are coming on line with little time for the staffs to gain experience. As I just mentioned, China, India, and many other countries have significant construction programs under way. While this is encouraging news, it also poses an enormous human resources challenge. Plant crews are very young and will have to grow into management positions quickly.

There is certainly a role for the World Association of Nuclear Operators and the worldwide nuclear community to bring these people into close contact with worldwide operational experience and standards of excellence through preoperational peer reviews and other means of exchange.

This leads me to a related point: New utility executives are coming into our industry with little or no nuclear experience. Many

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new CEOs did not grow up in this industry. They come from different business environments—very challenging, competitive ones—and now they are responsible for operating nuclear plants. They may not share the "emotional operating experience" of the founders of World Association of Nuclear Operators (WANO) who saw what accidents such as those at Three Mile Island-2 and Chernobyl could do to the industry.

The market is focused on short-term results. The nuclear industry must be managed for the long-term. Therein lies a potential conflict. But when viewed from a purely financial perspective, there is no better insurance policy than participating fully in nuclear programs such as WANO. It is vital for the CEOs of the world's nuclear companies to be involved and to provide strong leadership.

Another challenge to the emerging nuclear renaissance is the current performance of existing plants.

A fair question here would be, What is our view of the current levels of safety worldwide? When we look through the WANO window into plant performance—as seen through the operating experience program and through peer reviews—we see varying degrees of performance. The gap between the best performers and the worst performers is still too large in all four regions.

Another indicator of worldwide performance is the frequency of precursor events. Important precursor events are resulting in long shutdowns, which are expensive in terms of direct costs and production losses and in terms of eroding public confidence. But more important, these events are often symptomatic of deeper issues that may later manifest themselves in more significant problems.

In addition, when we look at the performance indicator results, we see that the rapid improvements that characterized WANO's first decade have stalled, or even declined in some areas. For example, plant availability and unplanned automatic scrams have leveled off since 2000, and unplanned unavailability has increased. These performance indicator trends are not alarming in themselves, but they paint a picture of performance that is not consistent with the continuous improvements of the past, and they are possibly an indication of complacency.

Every plant in the world needs to be in contact with the international nuclear community to get a clear vision of what excellence in nuclear safety looks like. An individual plant cannot develop this vision in isolation. But some plants—although they may have hosted a peer review six years ago—are not reporting events, are not participating in workshops or seminars, and send few if any peers to WANO activities.

Utilities with a large fleet of plants might be tempted to think that their experience base is sufficiently large that outside contact is not that important. This is the same mentality of self-sufficiency that existed prior to WANO's formation, and as we know all too well, the cost of isolation is high.

Another challenge is competition and the attendant cost-cutting, staff reductions, and production pressure. Let me state clearly my strong belief that high levels of safety and a competitive environment can coexist. I know this is true, because I have seen it in many places throughout the world. I have also seen examples in which the rigors of a competitive marketplace have tempted operators to reduce plant resources to a level that will not sustain safety and reliability.

Each nuclear operator must recognize and respond to the simple but profound fact that it is in its economic self-interest to ensure that every nuclear plant succeeds. In an age of instantaneous news coverage and limited public support for nuclear energy, an accident at one plant affects us all.

An additional concern is that commercial competition has the potential to erode nuclear cooperation. I challenge the industry instead to use increased competition as a catalyst to increase sharing among nuclear organizations. NN