

Aris Candris, President and Chief Executive Officer, Westinghouse Electric Company
Reaching new build potential requires addressing industry challenges together

The nuclear renaissance is no longer simply a vision for the future of the industry. With the new era of nuclear plant construction well underway, we must acknowledge and continually reaffirm that sustained success will require everyone, at every level, in every functional area, to execute flawlessly.

Everyone from CEOs to welders and crane operators, from CNOs to engineers and control room operators, must be constantly focused on innovation, efficiency, cost and schedule control. Unprecedented effort and cooperation will be required to make the fleet of new plants a reality, and a commitment to maintaining the existing fleet with an even higher level of safety and service will be essential.

With seasoned professionals leaving the industry, and young talent entering, knowledge transfer and management will be critical in every facet of the industry to ensure that projects are executed properly. Further, finding the talent to fill the shoes of the experienced personnel leaving the industry is a tremendous challenge for all of us. It's well documented that we must do everything we can to promote engineering disciplines at high schools and universities. However, the trade labor force cannot be overlooked. The expectation for quality work is just as critical in this area of the project as it is in the design and project management domains. A dropped module, a bad weld, or an improperly fitted pipe could cause a significant, if not catastrophic, setback to a project.

Westinghouse and others in the industry are addressing the needs at the trade labor level. One example is Westinghouse's WEC Welding Institute (formerly known as the Construction Institute of America or CIA Welding School). Recognized throughout the industry as one of the finest trade schools in the nation, it is now run under the auspices of Westinghouse as an affiliate of WEC Welding and Machining. The school graduates more than 140 highly qualified, certified pipe welders per year, helping to fill a critical industry need.

The need for knowledge transfer

The nuclear power industry has numerous challenges that have never been faced before, and everyone must play a role to address them. As mentioned earlier, there is a great need to transfer knowledge. The "implementers" who helped bring about the first deployment of plants worldwide three or four decades ago are now retirement-eligible, and effectively transferring this experience to a new generation of workers is critical to success.

Westinghouse, like our customers, suppliers and competitors, has programs in place to effectively and efficiently manage knowledge. Currently, Westinghouse utilizes a Critical Skills Matrix to identify and manage skills deemed vital to a particular department. In this approach, a technology leader, multi-specialist, and apprentice are identified. The program helps to ensure that knowledge transfer is performed properly and in the designated timeframe. It's a cross-functional effort that provides effective succession planning and execution, but it's not the only method for managing knowledge. Even virtual environments are being explored to assist in storing and accessing archived data in a variety of media, including documents, video, and photographs, and interviews with employees with particularly specific and extensive experience.

The shift in the supply chain landscape

When the initial fleet of plants came online decades ago, the supply chain landscape was unrecognizable compared to what we have today. In the United States, there was a much deeper manufacturing base, and the NSSS vendors, such as Westinghouse, were structured to supply a significant amount of resources and materials without great need to source externally.

Today, that landscape is entirely different. Westinghouse is solely focused on providing nuclear fuel, nuclear services, new plant design and engineering, and project management. Our supply chain is international, and in almost all cases, geared

toward providing upwards of 80% localization. This shift has allowed us to successfully provide varying degrees of scope for 20 nuclear power plants in the Republic of South Korea, where local sourcing was utilized, and technology was successfully transferred.

Our experience in technology transfer in South Korea was one reason behind China's decision to select the API 000 for the Sanmen and Haiyang sites. As a result, China will be the first in the world to operate advanced passive safety PWRs, and once again, Westinghouse will employ a high degree of localization in a manner that is mutually beneficial to both China and the United States. Already, the large forgings and other long lead items are in production, and site preparation is underway as we head toward the start of construction beginning in March 2009.

An increase in N-stamp facilities

In order for plants to be brought online on time and on budget, the international supply chain must continue to be cultivated. In the mid 1980s there were approximately 440 N-stamp accredited facilities in the US, meaning that the vendor produced commercial nuclear-grade components in accordance with the ASME Boiler and Pressure Vessel Nuclear Codes and Standards. Today there are more than 255 facilities with accreditation, up from just over 220 facilities as of January 2008.

While the number of N-stamp facilities has increased in the past year, it is unlikely that number of facilities will ever reach anything close to 1980s levels, due to industry consolidation and an increasingly global market outlook that requires ISO standards rather than N-stamp accreditation. However, it will be important for suppliers to the nuclear industry to continue to acquire the necessary certificates of accreditation, specifically in preparation for new build in the US. In return, plant suppliers must clearly and accurately communicate business requirements and objectives to vendors so that they can respond appropriately.

Meeting unprecedented demand with groundbreaking relationships

As the need for clean, carbon-free electricity continues to escalate in all corners of the world, we are presented with a scenario in which all major suppliers will be exceedingly busy bringing new plants online. Some projections indicate that as many as 200 new nuclear power plants could be built in the next 25 years. Even if the total is only half this amount, all sectors of the industry will need to work together, not against each other, to ensure success.

To address these challenges, never-before-seen partnerships are emerging. In 2006, Westinghouse was acquired by Toshiba, which in its own right was already a leader in nuclear technology. Today, Westinghouse is majority owned by Toshiba, along with minority owner The Shaw Group, IHI of Japan, and Kazatomprom of Kazakhstan. Together, Westinghouse and our shareholders represent a broad range of capabilities that can address the needs of new build, as well as the fuel and servicing needs of operating plants.

We are not alone in this approach. General Electric and Hitachi are working together in a similar arrangement, as are many others throughout the industry. Strategic acquisitions and strategic partnerships are essential to helping to bring about the next round of plants. It is only the beginning.

Public acceptance is essential

As we embark on a new era of nuclear power, we must not repeat the mistakes of the past when communicating the benefits of nuclear power to the public. In the 1970s and 1980s, the industry was ill-equipped to respond to the anti-nuclear contingents. Today, we have an incredible story to tell. The nuclear industry has an impeccable safety record, so much so that the US Bureau of Labor Statistics has recognized that working in the nuclear industry is safer than working in real estate or finance. It is this safety record, and the efficiency at which the existing fleet operates that has put the industry in the situation to experience the current renaissance.

The industry has been hesitant to celebrate our success, and has shied away from making comparisons to other forms of energy. The world needs to know that more than 6,000 people die each year in coal mines, that more than 10% of the world's CO₂ comes from coal plants, and that wind and solar, while suitable for supplemental energy, could never produce stable, cost-effective *baseload* electricity. We must arm the public with information, and all of us that work in the industry should be ambassadors for our cause. Nuclear power provides clean, efficient baseload electricity unlike any other technology, and this must become common knowledge.

Telling the positive story of nuclear power can and should extend to the financial community as well. It is estimated that in the next 12 years, a one trillion dollar investment will be required for new generating capacity, new transmission and distribution infrastructure, and environmental controls. Loan guarantees will play a significant role in lowering capital cost, and helping to keep electricity costs lower for consumers. However, for the industry to see true movement, all the pieces of the puzzle must fall into place: costs and schedules need to be accurate, risk needs to be minimized, and public acceptance of nuclear must continue to increase.

There are many indications that nuclear power is continuing to gain acceptance. The Eurobarometer survey, *Attitudes towards radioactive waste*, was published in July 2008. The results indicate that since the previous survey was published in 2005, there has been a steady evolution of public opinion in favor of nuclear power. There are now as many citizens who are in favor of nuclear energy (44%) as are against it (45%). This compares with 37% in favor and 55% against in 2005. This demonstrates that there is no reason to believe that public opposition can prevent nuclear new build from moving forward.

Radioactive waste remains a major concern. Of those against nuclear, four out of ten would change their mind if waste management issues were solved. A majority of EU citizens would then be in favor of nuclear power (61%), compared to 57% in 2005.

This positive shift reflects the renewed interest in nuclear power in Europe. Even in countries where a nuclear phase-out policy is being implemented, support for nuclear power is still quite strong (Sweden 62%, Germany 46%, Belgium 50%).

In the US, public support for nuclear power has reached a record high 70% approval. Concerns about energy supply and climate change are major drivers for the support of nuclear. Further, more than 60% support new build, with support being even higher among those that live near existing nuclear plants.

There are also indications that when political decisions to support new nuclear are made, public opinion tends to increase. It is also apparent that public support increases in accordance with the level of knowledge of nuclear power. Therefore, it is just as important now as it was decades ago to proactively communicate the benefits of nuclear power to the public and the financial community. The difference in our story today, however, is that we have a very positive history of excellent performance and safety at our operating plants.

All hands on deck

These are very exciting times for our industry. For those of us who have spent our entire careers in it, it's gratifying to see a new generation of plants again underway throughout the world. However, just as a horse can trip out of the gate, or a bicyclist can skid and cause the entire field to go down, the same is true for our industry. Failure is not an option, and the commitment to quality, risk management, safety, and project management must continually improve and evolve. Licensing must continue to become more streamlined. New talent must continually be identified, cultivated and mentored.

For the new generation, now is your time to help bring about one of the most exciting endeavors in the history of the industry, and quite possibly in the history of modern industrial development. The challenge of bringing a large number of plants online in the next two decades is unparalleled, and you will play the leading role in whether the effort is a success or not.