Blue Ribbon Commission on America's Nuclear Future
Reactor and Fuel Cycle Technology Subcommittee
Testimony of Dr. Henry J. Cialone, President & CEO – EWI
on behalf of the Nuclear Fabrication Consortium
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Good Morning Co-Chairs Domenici and Peterson and Members of the Commission.

I am Henry Cialone President & CEO of EWI located in Columbus Ohio.

EWI works with manufacturers in all sectors of industry from aerospace and automotive to consumer products and shipbuilding to help them be more competitive through the use of advanced manufacturing technologies. Two years ago, EWI created the Nuclear Fabrication Consortium to advance new nuclear fabrication technology that helps its members to support the domestic and international nuclear markets.

Rather than repeat statistics about nuclear power that you've already heard, I'd like to address your questions from the perspective of our experience with the Nuclear Fabrication Consortium and with other manufacturing sectors.

Capacity
Industry will respond to a recognized demand. For example, Westinghouse has opened a second WEC Welding Institute in the USA, as well as a training center for maintaining and refueling boiling water reactors (BWRs). The new welding institute - based at Westinghouse's new Boiling Water Reactor Training Center in Chattanooga, Tennessee - will train as many as 700 welders annually in both nuclear and non-nuclear operations.

What's needed to ensure that these efforts are sufficient to meet future demands is a clear picture of the future. If industry knows what plants will be built and when, it can take measures to get ready right now. One of the challenges is that many companies are skeptical of the timing and are making only limited investments at this time.

As nuclear deployment ramps up, the US must be poised to domestically supply parts and components. Similarly, the nuclear industry will be competing with the deployment needs and schedules of other advanced energy industries.

As an example, pipeline construction is forecasting a growth in demand between now and 2014 of 12% for engineers, 5% for welders and 16% for non-welding pipefitters for the natural gas industry alone, according to INGAA (Interstate Natural Gas Association of America). These skill sets are needed for other industries as well. The average cost to recruit these skilled workers is approximately $40, 000 per person. Average annual cost $15K per year in training to maintain and update their skills once you have attracted them to your company. The skills required for nuclear construction are more advanced and the requirements for entry into the

labor pool are more stringent than other construction applications, therefore acquisition and training costs would likely be higher.

We've learned through the NFC membership that they do not feel that they can rely on the network of community colleges to supply ready-to-work skilled labor. Because of this, many are developing their own in-house training programs to bring their labor pools up to necessary skill levels, in addition to Westinghouse.

In addition to needing a plan and understanding the competing demands for capacity, the US can improve its readiness to meet labor force needs by introducing new technologies that increase productivity of manufacturing operations. For example, the US Navy has an ongoing program called the ManTech Program that continually brings forward manufacturing technologies that reduce costs and increase quality. As an example, the Navy Joining Center, operated by EWI, is currently working on a project to replace conventional arc welding with mechanized tandem gas metal arc welding to increase productivity by 200-300 percent, with major savings in man hours. Another example involved the fabrication of a submarine structural component. This component was fabricated ten times faster by transitioning proven automotive manufacturing technology to the Navy's shipyard.

Capability

Nearly all manufacturing capabilities needed to build a nuclear reactor exist in the US today.

The main manufacturing capability that is not available domestically to meet generation forecasts is ultraheavy forgings. We believe there are ways to address this. Modifying the current generation of technological designs could minimize the total number of ultraheavy forgings required. Alternatively, implementing new manufacturing and welding techniques would enable fabrication instead of forging of these same complex components.

If just six additional welds were allowed in pressure vessel heads, current forging capabilities in the US would be adequate. Modern inspection technologies such as digital radiography and matrix phased-array ultrasonics would make this possible. The actual number of additional welds would, of course, depend upon the reactor design.

The other option is to invest in the ultraheavy forging capability in the US. Rough estimates to build a heavy forge, acquire special material handling equipment and construct a special purpose building range from $200 million for modification of an existing facility to $1 billion for a greenfield site.

Government Role

Government's role is on the side of reducing technical risk rather than commercial risk. Industry is capable of managing commercial risk. Government can enable the introduction of new technologies and assist the readiness of the workforce.

New manufacturing technologies can be introduced efficiently by leveraging the existing ManTech model currently in use by the Navy and the Air Force. A ManTech program for reactor construction would focus on high quality, high productivity technologies. At the same time, government should engage the university and community college systems to prepare the workforce to implement these new technologies.

Recommendations

In terms of domestic fabrication and manufacturing resources, I do not suggest that the sky is falling. Rather that this moment affords us an opportunity to reinvigorate our manufacturing base and its capabilities, increase our domestic capacity and improve our national security with the same set of measures.

EWI has heard from several NFC members that while domestic manufacturing capacity must be addressed, it is also vital that there be a focus on transitioning these technologies from the lab to US manufacturers. Looking to the existing portfolios of National Labs, they are consistently good at developing new technologies – out of the box that may be 20 or more years away from being deployable.

National Lab for Transitioning Technologies. Our recommendation is that the Department of Energy create a new type of National Lab that looks and feels like a ManTech center. A lab where new technology is not developed (because that's already being addressed by the existing National Lab system) but transitioned to a manufacturable and deployable state. This lab would be a place where high quality, high productivity manufacturing technologies would either be developed for nuclear applications or transitioned from other industries into nuclear construction, and demonstrated at scale. This would be a new entity that does what the National Labs were not designed to do, thereby allowing them to continue doing what they do best – world class R&D.

Repurposing Existing Assets. The other trend we've seen across the US is that as industries restructure, they often leave in their wake a variety of physical and human capital assets. A mechanism should be established to create a pool of these assets and transition them to meet current and future needs. Part of that effort could include stop gap measures to immediately shore up these resources in a way that prevents them from being dismantled and lost forever.

As an example, by early 2013, Northrop Grumman's Avondale facility near the Mississippi side of New Orleans will be closed. Avondale Shipyard has 5,000 skilled employees, including metal workers, welders, pipefitters, electricians and a whole list of specialty jobs that are related to shipbuilding. The site covers approximately 270 acres, has 174 enclosed buildings totaling 2 million square feet of space, 6,500 feet of wharves, and 2,900 feet of undeveloped waterfront. It also has industrial power and sewage, and all of the other infrastructure necessary to support heavy industry.

Avondale is a naval shipyard. Because of the level of expertise and sophistication needed to construct naval vessels, the workforce and facilities are ideally suited for the manufacture of advanced energy technologies especially high consequence large and heavy components. It would be an ideal location to build new capability for the US manufacturing base for future nuclear power plants. This is just one example, there are probably many others. We need a systematic approach to capture all of these opportunities and evaluate them.

Coordination for Success. One of the challenges to introducing new manufacturing technologies into the nuclear industry is regulatory acceptance. The NRC leverages independent consensus standards bodies like ASME, for example to build its regulatory framework. There needs to be coordination between these entities and developers of these new manufacturing technologies so that technologies that work can be used. A National Lab for Transitioning Technologies could provide this function.

There must be a plan to take advantage of opportunities, create alignment, connect the dots and identify and address overarching needs in this re-emerging industry sector.