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Testimony for the Record

Chairman Bingaman, Ranking Member Domenici and members of the Committee, I am Carol Berrigan, Director of Industry Infrastructure at the Nuclear Energy Institute. I appreciate this opportunity to express the nuclear industry's views on the availability of the work force necessary to meet our nation's growing energy needs.

Let me begin by thanking the Members of this Committee for their long-standing vision and leadership which has shaped our national energy policy most recently embodied in the Energy Policy Act of 2005. Key provisions in this legislation have accelerated the nuclear renaissance, including Title XVII loan guarantees, the production tax credit and regulatory risk insurance.

We commend the enactment of the America Competes Act, which establishes a solid policy framework for addressing the challenges in the science, technology, engineering and math (STEM) work force and we look forward to this Act's implementation. In addition, this Committee has long supported nuclear engineering education and university programs, and we encourage you to continue to reinforce the importance of these programs with the Department of Energy.

The 104 reactors operating in the United States today are among our nation's safest and most secure industrial facilities. In addition, they are the nation's lowest cost producer of base-load electricity, averaging just 1.72 cents per kilowatt-hour. Those 104 nuclear power plants produce one-fifth of America's electricity, and U.S. utilities are preparing to build advanced-design nuclear power plants to meet our nation's growing electricity demand.

According to EIA estimates, U.S. electricity demand is expected to grow by at least 40 percent by 2030. Meeting new demands for electricity will require energy providers to make major investments in new power plants, as well as in the transmission and distribution systems used to deliver electricity where it is needed. Cambridge Energy Research Associates estimates that, nationwide, the electric power industry will invest approximately $750 billion in infrastructure projects through 2020, with $250 to $300 billion in expenditure for new generation.

Nuclear energy holds great potential for meeting our nation's future climate related goals. Today, nuclear energy represents over 70 percent of the nation's emission-free generation portfolio, avoiding 3.12 million short tons of Sulfur Dioxide, .99 million short tons of Nitrogen Oxide and 681 million metric tons of Carbon Dioxide compared to the fossil fuels that would have been burned in the absence of nuclear energy.

Climate change is increasingly important as federal, state and local policymakers consider energy supply and greenhouse gas mitigation. Given those concerns and the need for affordable and reliable base-load electricity production, policymakers and energy industry leaders are evaluating an expanded role for nuclear power.

Both NRG and the Tennessee Valley Authority have announced that they have taken concrete steps toward this expanding role with the submission of Combined Operating License Applications for new nuclear reactors to be built in Texas and Alabama. There are currently 15 other companies or consortia who have announced plans to submit Combined Operating License Applications for up to 27 additional new nuclear power plants across the country.

Since the interest of this Committee is the availability of the work force necessary to meet our nation's growing energy needs, I will begin by describing the size of the work force needed to support the current nuclear industry and new nuclear construction. While the nuclear industry faces several challenges in meeting its future work force demands, along with these challenges are significant opportunities for American workers.

Current Nuclear Power Plants: Each nuclear unit in operation today directly employs 400 to 700 people[1]. In addition to direct employment, the nuclear industry relies on numerous vendors and specialty contractors for additional expertise and services. For maintenance and outages, nuclear plants also require skilled labor to compliment onboard utility staff, in some cases as many as 1,000 additional workers over a 4 to 8 week period, depending on the scope of the outage work. Based on an extrapolation of data supplied from the Associated Maintenance Contractors, over 30 million man-hours are worked by supplemental craft labor each year at the nation's 104 nuclear reactors.

NEI's 2007 nuclear work force survey indicated that 35 percent or 19,600 current nuclear utility employees will be eligible to retire within five years (2007 to 2012). In addition, the industry continues to experience non-retirement attrition, which over the same five-year period may require replacement of an additional 11 percent of the nuclear utility work force or 6,300 workers. Within the vendor community, the NEI survey indicated that roughly 25 percent of the work force would be eligible for retirement by 2012.

New Nuclear Power Plants: The resurgence of nuclear energy will lead to increasing demand for skilled labor at all levels. Depending on the build technique selected, NEI anticipates that each new unit will require between 1,400 and 1,800 workers for construction with peak employment of up to 2,300 workers. Some estimates with a shortened timeline and little use of modularized construction techniques have peak construction estimates at 4,000 workers per project. These jobs include skilled crafts such as welders, pipefitters, masons, carpenters, millwrights, sheet metal workers, electricians, ironworkers, heavy equipment operators, and insulators, as well as engineers, project managers, and construction supervisors.

If the industry were to construct the 31 units that are currently being discussed for COL applications, this would require 43,400 to 55,800 workers during construction with peak employment of up to 71,300. Once built, these 31 plants would require 12,400 to 21,700 permanent fulltime workers to operate the plants and additional supplemental labor for maintenance and outages.

[1] For some single unit sites, the number of workers may exceed 1000. In addition to direct employment, each plant creates economic activity that generates roughly an equivalent number of additional jobs within the local community and produces approximately $430 million annually in expenditures for goods, services and labor, and through subsequent spending because of the presence of the plant and its employees. The average nuclear plants also contributes more than $20 million annually to state and local tax revenue, benefiting schools, roads and other state and local infrastructure and provides annual federal tax payments of $75 million.

Manufacturing: One of the areas that is often overlooked in considering the work force impact of new nuclear construction are the manufacturing jobs associated with the nuclear industry. These jobs include the manufacture of components including pumps, valves, piping, tubing, insulation, reactor pressure vessels, pressurizes, heat exchangers, and moisture separators to name a few, and commodities like cement, structural steel, steel reinforcing bar, stainless steel, cable tray and cabling. According to a 2004 report from Idaho National Lab and Bechtel Power Corporation, if the industry were to deploy 33 to 41 new Generation III units through 2024, this could create 37,000 to 38,000 nuclear manufacturing jobs in the U.S.

About the Jobs: Jobs in the nuclear industry have many desirable attributes; they are well compensated and commonly include family medical benefits, pensions and generous incentive compensation plans. Today, the median salary for an electrical technician at a nuclear power plant is $67,517, for a mechanical technician, it is $66,581 and for a reactor operator, it is $77,782. A senior reactor operator's median income is $85,426. And, jobs in the nuclear industry are safe with fewer reported accidents than numerous other industries, including banking and other white-collar occupations.

Challenges and opportunities: Across the energy sector, there is a growing demand for skilled technical workers[2]. Many of the challenges facing the development the future STEM work force are identified in the National Science Foundation's "Gathering Storm" report. The nuclear industry, like the rest of American industry, faces increasing competition for engineering talent, while the supply of this talent remains static.

Despite the challenges noted in the NSF report, there is good news. We are seeing the resurgence of interest in nuclear careers at the college and graduate engineering level, most notably evidenced by the rapidly increasing enrollments in nuclear engineering programs. According to a recent study by the U.S. Department of Energy, enrollments in undergraduate nuclear engineering programs have grown from just 470 in the 1998 to 1999 academic year to 1,933 in the 2006 to 2007 academic year. Graduate enrollments have also climbed from 220 in the 1998 to 1999 academic year to 1,153 in the 2006 to 2007 academic year. The Bureau of Labor Statistics Occupational Outlook Handbook indicates median earnings for nuclear engineers are amongst the highest for all engineering disciplines at $84,880 per year.

Within the skilled crafts[3], challenges remain. Demand for skilled craft labor centers on three activities: construction, operation and maintenance. These activities are common to all energy infrastructure types, including fossil power, transmission, distribution, pipelines, petrochemical refining and nuclear power. Skilled craft labor, particularly for construction and plant outage maintenance (or turnarounds), is able to work on all types of energy infrastructure.

According to NEI's 2007 nuclear workforce survey, up to 39 percent of nuclear utility maintenance workers, 34 percent of radiation protection workers and 27 percent of operations staff may reach retirement eligibility within five years.

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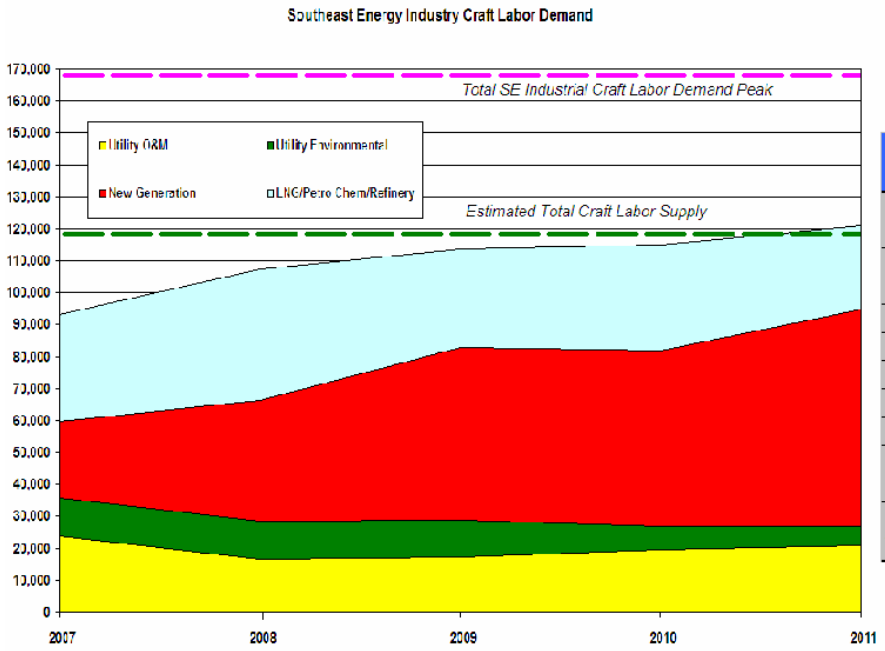
[2] Skilled technical workers include both degreed and non-degreed personnel.

[3] Examples of skilled craft labor include Boilermakers, Carpenters, Chemistry Technicians, Electrical Maintenance Technicians, Electricians, Heavy Equipment Operators, Instrumentation and Control Technicians, Insulators, Ironworkers, Lineworkers, Masons, Mechanical Maintenance Technicians, Millwrights, Non-Destructive Examination Technicians, Pipefitters, Power Plant Operators, Process Technicians, Quality Assurance Technicians, Quality Control Technicians, Radiation Protection Technicians, Sheet Metal Workers and Welders.

Non-utility skilled craft labor will likely be impacted by demographics-driven attrition as well. A report from the Construction Labor Research Council estimates that up to 185,000 new construction craft workers will be required nationally to replace the 95,000 retiring workers and deliver the necessary 1 percent to 2 percent work force growth between 2005 and 2015[4].

At the same time that demographics-driven attrition of non-utility skilled crafts is rising, numerous reports indicate a growing demand for skilled craft labor on a regional or national basis. Figure 1 illustrates anticipated demand for various types of industrial construction and maintenance workers in the Southeast. Although project demand after 2011 is difficult to forecast, many strong indications point to growing demand. When adding the expected rate of worker attrition to the estimates, the supply-demand imbalance is even more pronounced.

Figure 1: Skilled Construction Labor Demand and Supply (2007 — 2011)



Skilled Labor Classification	Total
Boilermakers/Tube Welders	21,998
Pipefitters/Combo Welders	38,150
Iron Workers	13122
Millwrights	14,985
Electricians	21,694
Carpenters	5,343
Insulators	1,207
Heavy Equipment Operators	2,076
Total Estimated Work Force	**118,575**

Source: South East Manpower Tripartite Alliance Survey 2007and Southern Company market research.

The nuclear industry draws its supplemental skilled craft labor and will draw its construction labor for new nuclear plants from the same labor pool that supports the rest of the energy sector. The demographics-driven attrition and growing demand that affects the skilled craft labor pool will have an impact on the nuclear industry.

[4] "Craft Labor Supply Outlook 2005-2015," Construction Labor Research Council, 2005

Recruitment: Recruitment into skilled crafts has several challenges. The first is a lack of awareness and prestige for these important occupations. A shift in cultural norms associated with skilled labor careers has contributed to the shrinking craft labor pool. Parents, guidance counselors and society in general push high school students to complete their secondary education with the intention of then attending a four-year college program. High-paying skilled labor jobs, once considered excellent career options, are now perceived as second class.[5] This shift in focus, compounded by some state government policies and varying interpretations of federal policy, has led to the elimination of many high school career and technical programs. That, in turn, further reduces the number of qualified applicants for skilled craft positions.

The nuclear industry faces additional hurdles. Specifically, there are few work force training programs focused on the skills needed for successful employment in the nuclear energy industry due to the industry's rigorous technical and personnel standards[6].

As the entire energy industry works to replace its aging work force and plans for new facilities and infrastructure, the overall decline in high quality career and technical education and a general perception that skilled crafts represent less valuable career choices have combined to restrict the pool of applicants for skilled crafts jobs.

Individuals often incorrectly perceive skilled labor jobs in the energy sector to require little or no post-secondary training. In fact, these jobs require certifications, offer high pay with benefits and provide opportunities to earn college credits. In an era of rapidly escalating college costs, the advantages of energy sector skilled craft jobs are poorly communicated to potential entrants, particularly as high school students are directed almost exclusively toward four-year degree programs. Improving awareness of skilled craft jobs in the energy sector and changing this misperception will undoubtedly lead to more students electing to enter skilled craft careers and enjoying long-term, high-wage employment.

Industry Response: The commercial nuclear industry is taking aggressive action to develop its future work force. The industry has been pursuing a variety of initiatives to increase career awareness through direct outreach efforts with professional societies, in high schools, and through the internet and other media. The industry has developed training programs and partnerships through high schools, union apprenticeship programs, skills centers, community colleges and universities. The nuclear industry also provides financial support and scholarships to students and is actively developing and engaging regional and state-based work force development partnerships.

In March 2006, the Center for Energy Workforce Development (CEWD) was established. It is a partnership between the Nuclear Energy Institute, the Edison Electric Institute, the American Gas Association and the National Rural Electric Cooperative Association. CEWD is a non-profit organization that teams with secondary and post-secondary educational institutions, organized labor and the work force system to create effective solutions to address the need for a qualified, diverse work force. CEWD programs include: career awareness, identification and replication of model programs and processes, and support for regional and state work force development partnerships. CEWD also endeavors to identify and address gaps in national work force data and promotes policies that support energy work force development.

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[5] "Where Have all the Welders Gone," Wall Street Journal Online, Aug. 15, 2006

[6] The nuclear industry is required to meet rigorous training and qualification standards for personnel. These standards are set by the Nuclear Regulatory Commission and the National Academy of Nuclear Training. In addition, some personnel must meet qualification requirements established by international standards organizations such as ASME and ANSI.

In August 2007, the Nuclear Energy Institute, the Edison Electric Institute and the American Petroleum Institute co-sponsored the Southeast Energy Skilled Trades Summit in Biloxi, MS. This Summit, hosted by the U.S. Department of Labor and the State of Mississippi, brought together nearly 300 key stakeholders from industry, organized labor, government, and the educational community to raise awareness about opportunities in the energy skilled crafts and develop concrete solutions to the energy skilled craft work force challenges in the region. This Summit was the first step in an ongoing process that has lead to the establishment or enhancement of numerous state-based consortia that are working to implement innovative work force development solutions locally. The industry, in partnership with the Department of Labor, is also investigating replication of this summit in other regions of the country.

Recommendations: Taken together, these programs represent an enormous investment of time and money in the future work force of the industry, but more is needed to develop the technical and skilled crafts work force that our nation will need to deploy additional generating capacity, including nuclear.

Specifically, we must:

- raise awareness of the impending skilled craft labor shortage and its impact on the energy sector
- elevate the image, status and prestige of skilled craft careers in the energy sector
- attract, recruit and train workers, particularly from untapped and under-represented labor pools
- align investments and work force development initiatives to ensure collaboration and coordination of government, industry and labor efforts in the develop the energy skilled trades work force
- build partnerships between industry, government, organized labor and the education community that promote talent and economic development
- implement performance-based education and training programs for skilled craft workers through vocational and technical education programs in secondary and post-secondary educational environments (including high schools, pre-apprentice, apprentiship, and community college programs).

Some have argued that wages for skilled crafts have had a negative effect on attracting new workers into the industry. The Nuclear Energy Institute and the American nuclear industry have a long, mutually beneficial relationship with our workers and with the unions associated with the nuclear industry sector. Our members believe that prevailing wages have a stabilizing effect in the nuclear construction industry by promoting good labor relations, encouraging work force training and supporting skilled worker retention. On behalf of our members, the Nuclear Energy Institute supports prevailing wages for this skilled work force and agrees with the inclusion of the prevailing wage provision for new nuclear projects covered by Title XVII loan guarantees.

Mr. Chairman, in conclusion, I encourage you and this Committee to continue your legacy of leadership on work force and competitiveness issues. Through greater national attention and the coordinated efforts of federal and state government, industry, organized labor and the educational community, we can and will build our future energy work force. Successfully addressing this challenge will enhance our national competitiveness and train tens of thousands of workers for the kinds of high-skill, high-wage jobs that built this nation.