STATEMENT FOR THE RECORD

by

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to the

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Chairman Bingaman, Ranking Member Murkowski, and members of the Committee, thank you for your interest in nuclear energy and in addressing the policies that can facilitate the research, development and deployment of small, modular nuclear power plants to meet national energy needs and reduce carbon emissions.

My name is Tony Pietrangelo. I am a senior vice president and the chief nuclear officer at the Nuclear Energy Institute (NEI). NEI is responsible for establishing unified nuclear industry policy on regulatory, financial, technical and legislative issues affecting the industry. NEI members include all companies licensed to operate commercial nuclear power plants in the United States; nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, materials licensees, and other organizations and individuals involved in the nuclear energy industry.

My testimony will cover three major areas:

1. Modular, small reactor designs can help achieve our clean energy goals and create jobs.
2. Public/private partnerships can accelerate development and deployment.
3. Legislation before your Committee contains practical, proven provisions.

1. Modular, small reactor designs can help achieve our clean energy goals and create jobs.

Near-term construction of large, new nuclear plants will address two of our nation's top priorities: Additional supplies of clean energy and job creation. Small, modular reactors can complement these large-scale projects by expanding the level of deployment and application options for carbon-free nuclear energy. Small-scale reactors provide energy companies and other users with a broader array of energy options. Each satisfies different needs in the U.S. energy portfolio and is part of a more holistic approach to the effective implementation of nuclear energy.

Today, nuclear energy is one of the few bright spots in the U.S. economy – expanding rather than contracting over the past few years – creating more than 15,000 jobs in design and engineering, in the nuclear supply chain, and in site preparation for new construction. In the same period of time, the nuclear industry has invested more than $4 billion in new nuclear plant development, and plans to invest approximately $8 billion more to be in a position to start major construction in 2011-2012.

These investments in new nuclear plants will help the United States meet its climate change objectives. Both the Energy Information Administration's assessment of the Waxman-Markey legislation and a recent National Academies' study on America's energy future found that the United States must nearly double the existing 100 gigawatts of carbon-free nuclear energy by 2030 to meet our climate goals. These studies are consistent with the International Energy Agency's findings in the World Energy Outlook

2009.[1] The agency found that by 2030, an additional 330 gigawatts of new global nuclear energy must be added, nearly doubling the existing global nuclear generating capacity, to achieve climate policy goals.

The United States and other nations are planning the construction of more than 130 new large and small, modular nuclear generating plants, which has increased interest in expanding the U.S. nuclear engineering and manufacturing capabilities and facilities.

Achieving deployment at this speed and scale represents a significant challenge. It must be undertaken in conjunction with an aggressive development and deployment of energy efficiency and conservation measures, renewable energy sources and other low-emitting energy technologies. This level of low/non-carbon emitting technology deployment will be a catalyst for a major expansion of the American engineering, manufacturing and construction sectors. It provides new industrial opportunities for state-of-the-art factories, foundries and fabrication facilities for domestic and export markets. Private investment and government incentives and support for what needs to be a mini-Marshall Plan for America will generate tens of thousands of high-paying jobs and clean energy.

While it is true that the United States yielded its leadership position to international competitors on nuclear plant manufacturing in past decades, we have not yielded our innovation or entrepreneurial spirit. Small-scale reactor designs already in development provide the opportunity to re-establish American global nuclear leadership.

Small reactor designs target a variety of market applications

There are many small, modular reactor designs under development to meet specific U.S. and international market needs. Small-scale designs may be more compatible with the needs of smaller U.S. utilities from a generation, transmission and financial perspective compared with large 1,400 megawatt plants. As a result, these smaller reactors will complement the construction of large nuclear energy facilities, which are the subject of intense regulatory review by the Nuclear Regulatory Commission.

Small light water reactors being developed are designed to exploit the benefits of modular construction, ease of transportation, and reduced financing, all of which could create a compelling business case. Since these designs are typically smaller than 300 megawatts electric (MWe), they could be used to replace inefficient fossil-fired power stations of similar size that may no longer be economical to operate in a carbon-constrained world. The infrastructure, cooling water, rail and transmission facilities already exist at such facilities.

Small-scale reactors can be built in a factory environment and shipped directly to the plant site. This will require the expansion and updating of existing facilities and the construction of new state-of-the-art factories. The small size and modular construction will allow these plants to be built in a controlled factory setting and installed module by module, reducing the financing challenge and matching capacity additions to demand growth.

A second set of small reactor designs are high-temperature gas-cooled reactors. These reactors could be used for electricity generation and industrial process heat applications, such as those used in the petrochemical industry. These reactors also could be used for the development of tar sands, oil shale and coal-to-liquids applications, resulting in a minimal life-cycle carbon footprint.

A third set of small, modular plants includes liquid-metal cooled and fast reactor technologies that hold the promise of distributed nuclear applications for electricity, fresh water and district heating in remote

[1] International Energy Agency's World Energy Outlook 2009, 450 Policy Scenario

communities. This group of reactor designs could provide nuclear fuel cycle services, such as breeding new fuel and consuming recycled nuclear waste as fuel. These reactors could also support government-sponsored non-proliferation efforts by consuming material from former nuclear weapons, thus eliminating them as a threat.

Small reactor technology has the potential to help America remove carbon from the electric, transport and industrial sectors. However, each small reactor technology has unique development needs and different timelines to reach the market.

2. Public/private partnerships can accelerate development and deployment.

The economic, energy security and environmental benefits of small reactor technologies make a strong case for accelerated development and deployment. However, a variety of factors must be addressed to achieve this outcome. The development and deployment of a new nuclear reactor technology can take two decades, with design costs exceeding $1 billion. The cost and time required to design, develop, and license a small reactor is not necessarily reduced linearly with size. In addition, it takes time and resources for the Nuclear Regulatory Commission to develop the institutional capacity to license new reactor designs.

All of these issues increase the risk and uncertainty for vendors that face expensive design and licensing challenges. Traditional partnerships between technology vendors, component manufacturers and end users are necessary but insufficient in themselves. Absent additional business risk mitigation through government incentives, the potential benefits of these small, modular reactor concepts may go unrealized.

Department of Energy's Nuclear Power 2010 program provides a successful model

There is a successful public/private partnership model for development of small-scale reactors in the Nuclear Power 2010 (NP 2010) program. This program has been successful in reducing business risk, enabling earlier deployment of advanced large reactor technologies. A government-industry, cost-shared program, NP 2010 has given project developers and technology vendors the necessary incentives to test a new NRC licensing and siting process. The lessons learned by these first projects will be shared with industry and NRC staff so that future applicants and NRC staff will have a better understanding of the expectations and standards for new reactors. When taken with the industry's commitment to standardization, NP 2010 will enable a more efficient and predictable review process. Furthermore, the funding for first-of-a-kind engineering is allowing completion of reactor designs to a level of detail that is enabling better cost estimates to be developed and long-lead components to be procured.

The NP 2010 program has achieved significant results to date including:

1. The approval of three early site permits. This activity has provided a roadmap for future early site permit applicants allowing sites to be pre-approved for a 20-year period.
2. The development and submittal of reference combined construction permit and operating license (COL) applications for NRC review and approval along with an additional 15 COL applications.
3. The development and NRC review of a design certification application for the General Electric ESBWR design and an amendment to the design certification for the Westinghouse AP1000 design.
4. The completion of engineering work to support development of construction cost estimates and procurement of equipment.
5. The development of guidance documents for applicants and NRC staff for implementing 10 CFR Part 52 that when coupled with the industry's commitment to standardization and the approval of the reference COL applications, should ensure that subsequent application development and review will be more efficient, significantly reducing the review schedules.

There have been substantial, additional benefits of the NP 2010 program beyond the technical achievements. For example, government and industry investments in the NP2010 program are expected to stimulate more than $100 billion in new nuclear construction over the next 10 years – creating tens of thousands of high-paying jobs.

3. Legislation before this committee contains practical, proven provisions

The industry supports the provisions in the two legislative proposals, S. 2052, Nuclear Energy Research Initiative Improvement Act of 2009, and S. 2812, Nuclear Power 2021 Act. In addition, we support the provisions in the proposed S. 2776, Clean Energy Act of 2009, as they relate to small, modular reactors.

S. 2052 authorizes the Secretary of Energy to carry out research, development and demonstration programs to reduce manufacturing and construction costs relating to nuclear reactors, including small-scale, modular designs. By focusing federal research support on programs to reduce the cost of licensing, construction and the manufacturing plant components, S. 2052 can accelerate the construction of small, modular reactors. The cost sharing provisions are designed to provide the greatest federal support to the research and development activities, with the cost share provisions for demonstration programs being shared equally by government and industry.

Chairman Bingaman's Nuclear Power 2021 Act directs the Secretary of Energy to carry out programs to develop and demonstrate two small, modular reactor designs. This legislation is targeted to reactors that are less than 300 MWe and requires that one design be not more than 50 MWe. It would seek to obtain design certifications and combined licenses for the two designs by 2021. Proposals for this initiative will be made on the basis of scientific and technical merit, using competitive procedures, and taking into account efficiency, cost, safety, and proliferation resistance.

We urge the sponsors of these proposed bills to work together and combine the small reactor provisions into a single bill. We support the proposed cost-share arrangements described in the proposed legislation. Legislation to develop small-scale reactor technology and allow for accelerated construction of the first reactor designs should include the following provisions:

- define the scope, priorities and funding for research and development;
- define the scope of government-private cost share provisions for design development and prototype simulation or testing;
- provide funding to assist the Nuclear Regulatory Commission and the industry in resolving generic regulatory issues specific to small, modular reactors;
- define private-government cost-share projects for the development, NRC review; and implementation of first-of-class combined license applications, up to the NRC authorization for fuel load.

There are several generic regulatory issues relating to construction and operation that must be resolved before designs can be completed to a level that supports a design certification, procurement and finalization of major contracts. These regulatory issues include: control room layout and staffing levels, unique design features, construction during operations, security, and the endorsement of advanced seismic technologies and designs that would enable these designs to be built in more areas of the country.

The industry's prime focus is the continued safe and reliable operation of the existing 104 nuclear power plants. Other main areas of industry focus include the construction of advanced, large-scale reactors on schedule and within the budget estimates, and the establishment of the necessary infrastructure, workforce and manufacturing capability, to support the new nuclear deployment projects The industry also attaches

high priority to achieving economic, political, and regulatory stability for the entire fuel cycle, including fuel supply, materials licensing and used fuel management and the deployment of small reactor technologies for electricity generation and use in industrial process heat applications.

Conclusion

The potential benefits of small, modular nuclear energy plants are substantial and should be pursued and supported. These designs expand the strategic role of nuclear energy in meeting national environmental, energy security and economic development goals. The nuclear energy industry believes that appropriate public/private partnerships, such as those described in S. 2052 and S. 2812, are important to ensure our nation continues to grow economically without adversely impacting the environment.

Thank you for the opportunity to present this information to the committee.