

**Statement of
John E. Kelly
Deputy Assistant Secretary for Reactor Technologies
Office of Nuclear Energy
U.S. Department of Energy**

**Before the
Committee on Energy and Natural Resources
U.S. Senate**

**S. 512, the Nuclear Power 2021 Act
and
S. 1067, the Nuclear Energy Research Initiative Improvement Act**

June 7, 2011

Introduction

Thank you, Chairman Bingaman, Ranking Member Murkowski, and Members of the Committee. This is my first testimony before Congress and it is a particular pleasure to be discussing small modular reactors (SMRs) with you, as they have been an area of great interest to me for some time.

Before joining the Department of Energy, I co-chaired an American Nuclear Society special committee that was developing solutions to generic licensing issues for small modular reactors. Over the course of the last 18 months, this special committee, together with the Nuclear Energy Institute, the Nuclear Regulatory Commission and the nuclear industry, has made great progress in forging the blueprint for the regulatory framework for small modular reactors. This progress demonstrates an increased interest in the licensing and commercialization of SMRs.

The Administration continues to view nuclear power as an important clean energy option. Small modular reactors, specifically reactors that have an electrical output of less than 300 megawatts, are a promising and innovative technology. We see these smaller reactors as giving our utilities additional clean energy options and allowing nuclear power to penetrate the energy market more broadly. Secretary Chu has written that, “if we can develop this technology in the US and build these reactors with American workers, we will have a key competitive edge”. SMRs are already inspiring American innovation and have the potential to significantly enhance U.S. competitiveness.

Since former Assistant Secretary Dr. Pete Miller testified to this Committee in 2009 on the two bills we are discussing today, several developments have taken place. A little

over a year ago, we released our fiscal year 2011 budget request, which proposed a small modular reactor program with \$40 million of funding. The proposal was to spend half of that funding on R&D efforts and half to initiate a competitive selection process to establish public-private partnerships to cost-share design certification and licensing efforts with the selected winners.

Earlier this year, the Department released its fiscal year 2012 budget request, which included an expanded version of the small modular reactor program. The request for FY 2102 is \$29 million for R&D and \$67 million for design certification and licensing activities. The DOE request outlines a multi-year, \$452 million program that would use cost-shared arrangements with industry partners to complete design certification activities for up to two light water small modular reactor designs. There are several potential SMR vendors pursuing both LWR designs and more advanced concepts. Many utilities are interested in this technology to replace aging fossil plants.

The events at the Fukushima nuclear power plants have led the Nuclear Regulatory Commission to launch a 90-day review to see what lessons can be learned from the Japanese experience and applied to U.S. nuclear plants. I want to note that designers of light water SMRs have already placed major emphasis on the inherent safety of these reactors. Because of their lower power level, SMRs have a much lower level of decay heat and therefore may require less cooling after reactor shutdown. Several designs incorporate passive safety features that utilize gravity-driven systems rather than engineered, pump-driven systems to supply backup cooling in unusual circumstances. Some concepts use natural circulation for normal operations, requiring no primary system pumps and providing an even more robust safety case. In addition, many SMR designs utilize integral designs for which all major primary components are located in a single pressure vessel. That feature results in a much lower susceptibility to certain potential events, such as a loss of coolant accident, because there is no large external primary piping. Lastly, most SMRs can be sited underground, which should improve their security profile and may enhance seismic safety.

Comments on S. 512 and S. 1067

Turning to the two bills under consideration by the Committee, the Department has a few comments.

S. 1067 gives broad authority to conduct research into small modular reactors, as well as other connected issues.

S. 512, the Nuclear Power 2021 Act, would require the Department of Energy to carry out a program to develop and demonstrate two small modular reactor designs. If passed, several factors would be important to consider:

- The requirement that at least one of the designs be less than 50 MW is too restrictive; simply having an upper bound of approximately 300 MW_e would be more appropriate. Cost-shared design development and licensing should be based

on competitive procurements and the market place should establish the appropriate design parameters.

- The licensing effort should include two different designs.
- The program should initially be focused on light water reactor technology based on the large amount of experience – both design and licensing – with such reactors.

Conclusion

That concludes my formal remarks. Thank you for the opportunity to testify and I look forward to answering your questions and working with the Committee to achieve the administration's goals of energy security and reducing the nation's carbon emissions.