TESTIMONY OF
Thomas L. Sanders
President
American Nuclear Society

BEFORE THE
HOUSE SCIENCE ANF TECHNOLOGY COMMITTEE

May 19, 2009

Chairman Gordon, Ranking Member Hall, members of the Committee, thank you for the opportunity to testify. I am here in my capacity as President of the American Nuclear Society (ANS). ANS is dedicated to the peaceful use of nuclear science and technology and comprised of 11,000 men and women who work in the nuclear industry, our national labs, universities and government agencies.

In general, the ANS membership believes that nuclear energy can and should play a major role in supplying energy in a carbon-constrained environment. We applaud Assistant Secretary Miller and his team for developing a comprehensive R&D roadmap to guide the Office of Nuclear Energy's investments going forward. My testimony today focuses on the need for DOE to facilitate the development and deployment of a new generation of small modular reactors.

The nuclear debate in Washington these days focuses on the cost of nuclear versus other forms of energy -- and specifically the large up-front costs of installing new nuclear generation capacity. Clearly, SMRs have great potential to address nuclear energy's upfront cost challenges by allowing the cash flow from initial reactor modules to help finance subsequent additions. However, to view the nuclear issue only through the lens of the US market is to miss half the picture.

The world is embarking on a nuclear expansion with all the opportunities and risks associated with it. While we tend to hear about countries like Iran and North Korea, most nations interested in nuclear energy are motivated by a sincere desire to improve standards of living for their people. And in general, a world with plentiful clean energy will be more peaceful, more prosperous, and more environmentally sustainable over time.

Indeed, the US actually has very little say over whether this renaissance happens. The Nuclear Nonproliferation Treaty guarantees that all signatories have the right to enjoy the peaceful benefits of nuclear energy technology. In addition, the nuclear energy supply infrastructure has become thoroughly globalized in the last three decades. Frankly, if the US is unable or unwilling to provide nuclear technology, interested nations have plenty of other supplier options.

The choice we in the US face today is clear. We can either commit ourselves to facilitating this renaissance as a major supplier of safe, proliferation-resistant nuclear technology, or we can stand on the sidelines and cross our fingers that other supplier nations will do it for us.

If we choose the path of engagement, the next step required is to develop nuclear power systems that are suited for the global marketplace. More than 60 countries are actively seeking or have expressed interest in developing new nuclear energy generation capacity. At the same time, over 80% of the world's power grids are not large enough to absorb a 1 GW class nuclear plant.

That is where SMRs come into the picture.

SMRs comprise a diverse set of technologies. The common thread is their size, generally from 10 to 300 MW electricity, small enough to be shipped on a flatbed or rail car and exported to other nations as a complete unit.

For purposes of this discussion, SMRs can be grouped into four different types.

1. Small light water reactors: these are based on well understood technology and the US has an existing manufacturing capacity for supplying the Navy with propulsion reactors. These reactors would make an attractive option for existing nuclear plant operators to add capacity in a scalable fashion in the near term.

2. Sodium or lead cooled fast reactors: these are small pool type reactors that operate at low pressures. Their fast neutron spectrum could allow for extended refueling intervals of up to 20-30 years. They have desirable safety characteristics, and when combined with advancements in turbine technology, can be operated in an extremely safe manner for long periods of time.

3. High-temperature gas reactors: these proposed designs are generally optimized for process heat applications such as hydrogen production, water desalination, shale oil recovery. They could be located in industrial parks to offset the use of fossil fuels for process heat generation.

4. The fourth category is what I call exotic designs. While these innovative concepts will require longer-term research and development efforts, their simplicity of operation could provide "walk away safe" power to remote communities here in the US and around the world.

There are some who are not comfortable with the notion that the US should actively promote and supply nuclear technology around the world. They believe that the risks of proliferation are too great. However, there is an emerging consensus in the ANS membership and the US nuclear community that in fact the opposite is true -- that a revitalized domestic nuclear manufacturing sector is a *critical and necessary* component to sustaining US nuclear influence around the world.

So, what would a revitalized, SMR-focused US nuclear manufacturing industry look like?

Our national security infrastructure provides us with a head start. We already have a manufacturing infrastructure for small naval reactors. We have an operating geological repository in our defense infrastructure that could potentially accommodate transuranic waste from recycled SMR fuel. We have many years of operational data for water and sodium cooled systems. We already have modular manufacturing techniques. We have the ability to make the fuel envisioned in these designs. What we need is the collective will make long-term investments so that the US can again be a major supplier to the global nuclear marketplace.

NE's R&D roadmap is a good start in that direction. It takes a crosscutting approach to identifying areas of R&D focus applicable to sustaining the current US fleet of nuclear plants, developing new reactor designs and fuel cycles, ensuring a high level of operational safety, and minimizing the risks of proliferation. I believe these areas of focus are appropriate to the task and DOE should be applauded for sharpening its pencil.

As always, the key item of debate is the proper balance between fundamental R&D activities like modeling and simulation and initiatives specifically targeted at accelerated deployment of real, operating reactors. I can tell you that, as ANS president, I've traveled the country and met with hundreds of ANS members with nuclear engineering backgrounds. If there is one common theme in these conversations, it is that the US cannot afford to be overly cautious in developing advanced reactor systems. We are in a race after all, and if we do not move forward with speed and purpose, we will forever be in catch-up mode.

Personally, I believe that DOE must make revitalization the US nuclear industry one of its stated objectives. We need a U.S. industry capable of supplying "cradle-to-grave" technology solutions that eliminate the incentives for nations to develop sensitive enrichment and reprocessing capabilities. I also believe we must ensure that US industry is the primary beneficiary of taxpayer investments in nuclear technology, so that we maximize the economic and job creation benefits of our investments..

So while I support the broad contours of the R&D roadmap, I hope Congress will consider giving DOE additional tools to accelerate deployment of next-generation reactors so that we may be better positioned to meet our environmental, national and economic security objectives in the next 10 to 20 years.

This concludes my testimony and I would be happy to answer any questions the committee may have.