# Testimony of Marilyn C. Kray Vice President, Exelon Nuclear and President, NuStart Energy Development

# Senate Environment & Public Works Committee Subcommittee on Clean Air, Climate Change, and Nuclear Safety

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Chairman Voinovich, Senator Carper, Members of the Subcommittee:

Thank you for the opportunity to appear before you today to discuss NuStart Energy Development's activities. I am Marilyn Kray, Vice President of Project Development for Exelon Nuclear and President of NuStart Energy Development.

NuStart is a consortium of nine U.S. power companies and two reactor vendors<sup>1</sup> that was formed last year with two purposes: first, to demonstrate the Nuclear Regulatory Commission's never-before-used licensing process to obtain a combined Construction and Operating License (COL) for an advanced nuclear power plant; and second, to complete the design engineering for two advanced reactor technologies, General Electric's Economic Simplified Boiling Water Reactor (ESBWR) and Westinghouse's Advanced Passive AP-1000. NuStart activities are being funded by the Department of Energy on a 50/50 cost sharing arrangement under the Nuclear Power 2010 Program.

Demonstrating the NRC licensing process and completing the engineering for new reactor designs are critical first steps toward the construction of a new generation of reactors in the United States, and the NRC will play a central role in both efforts.

NuStart plans to submit two COL applications to the NRC in 2008, and we anticipate that the Commission will complete its review of the applications by 2011. COL approval would allow a company or consortium of companies to begin construction of a new reactor with the hope of having a plant begin operation by 2015.

In general, the nuclear industry has identified seven preconditions to the construction of new nuclear plants. In addition to the NuStart objectives of demonstrating the regulatory process and the completing reactor designs for passive technologies, these include:

- a demonstrated need for new base load power
- confidence in a long-term solution for used fuel disposal
- public confidence in nuclear power
- a sound nuclear power infrastructure
- acceptable financial returns

<sup>&</sup>lt;sup>1</sup> Power companies include: Constellation Energy, Duke Energy, EDF International North America, Entergy Nuclear, Exelon Generation, Florida Power and Light, Progress Energy, Southern Company and Tennessee Valley Authority. Reactor vendors include General Electric and Westinghouse.

I would like to touch briefly on each of these issues and to discuss the important role that the NRC and this Committee play in many of these areas.

## **Demonstration of Regulatory Process**

As noted above, one of NuStart's primary objectives is to demonstrate the Nuclear Regulatory Commission's never-before-used licensing process to obtain a combined Construction and Operating License (COL) for an advanced nuclear power plant.

Obtaining a COL is a critical step in a potential renaissance of the nuclear power industry in the United States. By achieving this, NuStart hopes to demonstrate that the COL can be obtained on schedule and within budget, and that advanced plant designs can be approved. Further, NuStart's efforts will provide a realistic time and cost estimate for building and operating a new nuclear plant in today's environment.

During the 1980s, nuclear plants were plagued with significant cost overruns due in large part to the regulatory uncertainty inherent in the NRC licensing process. Many major issues were argued and litigated only after plants had been constructed, in some cases delaying plant operations for years.

Congress took an important step to reform the licensing process as part of the Energy Policy Act of 1992 with the codification of the NRC's combined Construction and Operating License regulations under 10 CFR Part 52. The COL process is designed to provide all parties with an opportunity to raise issues related to siting and plant design before a license is granted. Once a plant is built, the only question before the Commission is whether the licensee has constructed the plant in conformance with its license. On paper the process appears to be sound; however, investor confidence will not be established until the process is demonstrated, as proposed under the NuStart project.

The new licensing process also gives potential licensees an opportunity to have sites preapproved by the Commission. The Early Site Permit (ESP) process allows a potential licensee to apply to the Commission for approval of a site for a new nuclear plant. Companies provide the NRC with extensive data on the proposed site, as well as information about the reactor design that could be built on the site. If a site is approved, a company can "bank" the site for as long as 20 years.

Also under the Department of Energy's Nuclear Power 2010 program, three companies have received matching funds to develop and submit Early Site Permit applications to the NRC: Dominion's North Anna site in Virginia, Entergy's Grand Gulf site in Mississippi, and Exelon's Clinton Power Station in Illinois. All three applications are currently under review by the NRC, and we expect the Commission to issue the resultant permits starting in second half of 2006

Other issues related to a stable regulatory environment include NRC management and security regulations for licensees.

The Commission's Regulatory Oversight Process, which seeks to focus NRC activities on those issues which carry the highest level of safety significance, has provided objective, measurable, safety-significant performance indicators that can be used as a basis for the assessment of licensee performance.

S. 864, the Nuclear Safety and Security Act, makes important reforms to the Atomic Energy Act to grant the NRC additional authority related to plant safety and security. The bill authorizes the use of firearms by security personnel and requires fingerprinting and criminal background checks for key personnel.

What remains, however, is the identification of any additional security requirements that may be imposed on new plants. Incorporation of these further enhancements into the ongoing design development will be easier the earlier they are identified.

### **Completion of Reactor Designs for Passive Technologies**

Another aspect of the revised NRC licensing regulations allows reactor vendors to submit designs to the NRC for Design Certification. This process allows the NRC to evaluate potential designs and allows for public participation in the certification process. Once a design is certified by the Commission, it can be paired with an Early Site Permit and used in the submission of a Construction and Operating License.

NuStart plans to complete the design engineering for two advanced reactor technologies, General Electric's ESBWR and Westinghouse's AP-1000. NuStart selected these technologies because they represent the optimization of operational confidence and innovation. They are natural evolutions of the designs currently in operation, yet both of these technologies adopt simplified design features and technology improvements that rely on inherent, passive safety systems. In this context, "passive" refers to design principles wherein laws of nature such as gravity feed, convective heat transfer and natural circulation are used in place of complex systems comprised of numerous pumps, valves and actuation devices. The result is an enhancement to safety because there is less reliance on equipment performance and operator action, and a reduction in cost because there is less equipment to construct and maintain.

NuStart's work with the reactor vendors to complete the one-time generic engineering work necessary for the standardized plant designs will position these technologies for deployment when needed, thereby significantly reducing the time to market for a new nuclear plant.

We are working closely with the Commission to assure that adequate staff resources will be in place to review the designs in a thorough and timely manner.

### **Need for Base Load Power**

Before any company commits to new generation, there must be confidence that there will be a need for new base load power. In some regions of the country, new base load power will be needed in the near future; in others, however, electric capacity is estimated to be sufficient to meet demand for the next 10 years or more. The market, not the energy industry nor the Federal government, will dictate when new base load power is needed.

## A Long-Term Solution for Used Fuel Disposal

While nuclear energy has a proven track record in the United States as a clean, economic and reliable source of energy, used fuel from nuclear plants must be managed to permanently isolate it from the environment.

Before new plants can be built, energy companies, investors and the public must be confident that there is a long-term solution for the disposal of used nuclear fuel. While individual companies may have different views on what constitutes an acceptable solution, it is essential that the Federal government continue to make progress on meeting its statutory and contractual obligation to begin removing used fuel from reactor sites.

In 1982, the Federal government codified its obligation to assure for the permanent disposal of high-level radioactive waste and used nuclear fuel. In 2002, Congress upheld President George W. Bush's designation of Yucca Mountain, Nevada, as the site for the nation's permanent, deep geologic repository. While the Yucca Mountain project faces a number of challenges, the industry is confident that it will prove to be a scientifically suitable site for the permanent disposal of nuclear material.

The NRC will play a critical role in reviewing the license application for the proposed repository, and it is essential that the Commission have the resources necessary to complete its review.

### **Public Confidence in Nuclear Power**

New nuclear power plants cannot be built without a high degree of public confidence in the safety of the technology, the competence and commitment of reactor operators, and the dedication of regulators. The industry recognizes that public confidence is based on the performance of our current fleet of plants. We must remain ever vigilant to the safety responsibility entrusted to us.

Public awareness of nuclear energy's positive contribution to energy independence, clean air, and a reliable, low-cost energy supply, has led to greater support in recent years. The nuclear industry's commitment to safe operations and its proven track record over the last 25 years have also reinforced public support for nuclear technology. In fact, recent surveys conducted on behalf of the Nuclear Energy Institute indicates that support for

nuclear energy is at an all-time high, with 67 percent of Americans favoring the use of nuclear energy.

Public confidence in nuclear energy is also reinforced by the Price-Anderson Act, which assures that the public will be compensated quickly in the unlikely event of a nuclear incident. The Price-Anderson Act serves as a no-fault insurance policy, similar to that approved by Congress in the aftermath of the 9/11 attacks. Under Price-Anderson, the nuclear industry provides over \$9 billion in coverage for a nuclear incident. Should claims exceed that amount, Congress is authorized to provide for additional compensation, including additional contributions from reactor owners. It is important to note that no taxpayer funds have been paid as a result of the Price-Anderson Act.

Both the Department of Energy and the Nuclear Regulatory Commission support Price-Anderson extension. While S. 865, the Price-Anderson Amendments Act of 2005, calls for a 20-year extension of the Act, the nuclear industry strong supports an indefinite extension of the Act.

The formation of NuStart resulted in significant public attention and led community leaders in Port Gibson, Mississippi; Oswego, New York; and Aiken, South Carolina to contact the consortium to express interest in having a new plant built in their area.

Last week, NuStart reached a major milestone with the announcement of six candidate sites for new reactors. These sites will be evaluated over the next several months, and two sites will be chosen for inclusion in NuStart's COL applications. The sites named last week are:

- Bellefonte Nuclear Plant, Hollywood, Alabama, owned by the Tennessee Valley Authority
- Grand Gulf Nuclear Station, Port Gibson, Mississippi, owned by Entergy Nuclear
- River Bend Nuclear Station, St. Francisville, Louisiana, also owned by Entergy
- Savannah River Site, a Department of Energy facility near Aiken, South Carolina
- Calvert Cliffs Nuclear Power Plant, Lusby, Maryland, owned by Constellation Energy
- Nine Mile Point Nuclear Station in Scriba, New York, owned by Constellation Energy

## **Nuclear Power Infrastructure**

A critical challenge for the nuclear industry is the continued presence of a strong nuclear power infrastructure. This infrastructure includes the engineering expertise to design, construct, and operate plants; the existence of a strong educational network at the nation's colleges and universities; and the presence of knowledgeable and dedicated personnel to staff the Nuclear Regulatory Commission.

The lull in the construction of new nuclear power plants in the 1990s led to a decrease in the number of nuclear engineering students in American universities. As with many other businesses, the nuclear industry faces an aging workforce. If the commercial nuclear

power industry in the United States is to expand, it is imperative that the nation has a skilled workforce that is ready to construct, operate, and support new plants.

S. 858, the Nuclear Fees Reauthorization Act, includes provisions to addresses the human capital issue by authorizing the Commission to support institutions of higher learning to support courses related to nuclear safety, security or environmental protection; establishing an NRC scholarship and fellowship program; and authorizing the Commission to establish a partnership program with institutions of higher learning to promote education and research in relevant fields of study.

## **Acceptable Financial Returns**

As a final prerequisite for new plant construction, companies will have to be confident that they can provide their shareholders with an acceptable financial return on their investment. Any investment in nuclear power must look attractive not only on an absolute basis, but superior to other fuel alternatives.

While the industry is optimistic that nuclear generation can be competitive to the other alternatives, it does expect that the "first mover" investors will face significant hurdles unique to a nuclear investment. Accordingly, financial incentives to stimulate construction of new nuclear plants will be needed. These incentives should address factors such as the licensing risk, investments risks and the issues that make it difficult for companies to undertake capital-intensive projects (i.e. earnings dilution during construction and long period for recovery of capital investment under existing tax depreciation rules). Such a cooperative industry /government financing program for the first plants is a necessary and appropriate investment in U.S. energy security.

#### Conclusion

Nuclear power is a critical component to our nation's overall energy portfolio and our pursuit of energy independence. Our interest in nuclear power is not to the exclusion of other energy sources. To date, nuclear power has managed to uphold its 20 percent contribution level despite the growing demand. This was possible because of the improvement opportunities to uprate the units and improve capacity factor. These opportunities are close to being exhausted. As a result, the percentage contribution level of nuclear will begin to decrease absent the construction of new plants.

One of the foundations of the nuclear industry is the commitment to planning. Although there is no immediate need for base load power, we recognize that action is needed now in order to preserve the nuclear option for the future. By identifying the preconditions for new plants we are able to develop action plans to address them. NuStart was formed to serve as the unified industry mechanism for addressing certain of these preconditions.

Thank you for the opportunity to appear before you today.