

Testimony of

Marilyn C. Kray

Vice President, Project Development

Exelon Nuclear

on behalf of

NuStart Energy Development LLC

United States Senate

Committee on Environment & Public Works

Subcommittee on Clean Air, Climate Change and Nuclear Safety

May 20, 2004

**Written Statement of
Marilyn C. Kray on Behalf of NuStart Energy Development LLC**

Chairman Voinovich, Senator Carper, and Members of the Subcommittee:

I am Marilyn Kray, Vice President of Project Development for Exelon Nuclear, a subsidiary of Exelon Corporation. I am appearing today in my capacity as the lead representative of NuStart Energy Development, a recently formed consortium of power companies and reactor vendors. Thank you for the opportunity to appear before you today.

Congress has an important role in providing oversight of the Nuclear Regulatory Commission, and this oversight will be particularly important as the Commission proceeds with a new process for licensing nuclear power plants. My testimony today will focus on the benefits of nuclear power, the Department of Energy's Nuclear Power 2010 Initiative, the formation of NuStart Energy Development, and the prerequisites for the construction of new nuclear power plants.

Benefits of Nuclear Power

Nuclear power is a safe, clean, reliable and economic method of generating electricity. Indeed, the nation's 103 operating reactors provided over 20 percent of the electricity generated in the United States last year.

Nuclear plants are safe, both from an operational and a homeland security perspective. Despite concerns expressed by some that nuclear plants would become less safe as plant

operators focused improving operational efficiency, data has shown that plant performance and safety go hand-in-hand. The best performing plants in terms of capacity factor also have the fewest safety-related incidents. Operational excellence not only increases plant output, it also enhances safety. In fact, commercial nuclear plants have an exceptional record of worker safety.

From a security perspective, independent reviews of commercial nuclear power plants have shown these plants to be perhaps the most secure industrial facilities in the United States. The same plant features that are used to isolate the public from radiation also serve to fortify the plants against outside intruders. Nuclear security, already robust prior to September 11, 2001, has been significantly enhanced since that time. Plants have made significant capital investments to upgrade security and have roughly doubled the size of their security forces.

Nuclear power is also one of the cleanest sources of electric generation. Since nuclear power is not based on combustion, nuclear plants emit none of the air pollutants associated with climate change, acid rain, or smog. Since the electricity produced by nuclear plants displaces electricity that would otherwise be supplied by fossil-fired power plants, it is estimated that U.S. nuclear plants avoided 3.38 million short tons of sulfur dioxide, 1.39 million short tons of nitrogen oxides, and 189.5 million metric tons of carbon dioxide during 2002.¹

Nuclear plants do not discharge pollutants into the water, though they do discharge warm water into the environment. These discharges are carefully regulated and monitored to

¹ Calculated by the Nuclear Energy Institute using regional fuel emission rates from EPA CEMS data and individual plant generation data from the Energy Information Administration. Last updated September 2003.

protect aquatic life. And while nuclear plants do generate radioactive waste materials, these wastes are carefully managed and are isolated from the environment.

From a reliability perspective, nuclear plants are an ideal source of baseload generation. Demand for electricity is expected to grow by 50 percent by 2025, according to the Department of Energy. Nuclear power will be necessary to ensure that the U.S. maintains a balanced, diverse and reliable electricity supply while protecting the environment.

In 2003, the U.S. reactor fleet produced 766.5 billion kWh of electricity at an average capacity factor of nearly 90 percent. In part, this is due to the inherent design philosophy to run for extended periods of time between scheduled refueling outages. Most nuclear plants now run on a two-year cycle between refueling outages. Because of these long run cycles, nuclear plants are not subject to fuel delivery issues that can affect some generation sources. In addition, unlike other generation sources, nuclear plants are generally not affected by weather conditions.

Finally, nuclear generation has proven to be an extremely cost competitive form of electricity generation. For 2002, nuclear plant production costs, which encompass fuel and operation and maintenance costs, were 1.71 cents/kWh. These production costs were lower than comparable costs for coal, which were 1.85 cents/kWh, and significantly lower than natural gas and oil, whose production costs were 4.06 cents/kWh and 4.41 cents/kWh, respectively.²

² U.S. DOE/Nuclear Power Industry, *Strategic Plan for Light Water Reactors Research and Development, First Edition, February 2004.*

DOE's Nuclear Power 2010 Initiative

Despite the nuclear industry's impressive performance in recent years, companies have been reluctant to consider investing in new nuclear plants. Uncertainty regarding the NRC's new licensing process, new advanced reactor designs, the future regulatory environment, the existence of a repository for used nuclear fuel, and the future of electricity markets in the U.S. all represent risks that give investors pause when it comes to nuclear power.

Recognizing the valuable role of nuclear energy in meeting the nation's current and future energy needs, Energy Secretary Spencer Abraham unveiled the Department of Energy's Nuclear Power 2010 initiative in February of 2002. The program seeks to partner with the private sector to achieve three goals: (1) to evaluate potential sites to host new reactors; (2) to demonstrate the Nuclear Regulatory Commission's licensing process for new plants; and (3) to conduct research to promote safer and more efficient nuclear plant technologies in the United States.

In June 2002, the Department awarded grants to Dominion, Entergy, and Exelon in support of their proposals to develop and submit Early Site Permit applications to the Nuclear Regulatory Commission. Each company submitted their application to the NRC for review in the Fall of 2003. Final NRC action on the applications is expected in 2006.

In November 2003, the Department issued a formal solicitation inviting cooperative agreement applications to demonstrate the NRC's combined operating license (COL) process. The solicitation encouraged a consortium approach among power generation

companies, plant owners and operators, reactor vendors, architect engineers and construction companies and proposed a 50 percent minimum industry cost share over the life of the project.

In 1989, the NRC introduced 10 CFR Part 52, an improved and more efficient licensing process for new nuclear plants. However, this process has not been demonstrated, and the prolonged regulatory interactions on previously licensed plants only serves to increase the financial community's uneasiness over the NRC's licensing process. This is why DOE's Nuclear Power 2010 Initiative is essential.

The Part 52 process has three subparts: Early Site Permits, Design Certification, and Combined Construction Permits and Operating Licenses. These subparts have common concepts and common principles. It is important for these common concepts and principles to be maintained during the reviews, issuance and implementation of the Part 52 subparts. For example, one of these common concepts, the Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC), is applicable in design certification and in the combined license element. The principles for the design certification ITAAC are the same as for the combined license ITAAC, though the regulatory reviews may be years apart. If these concepts and principles – which include implementation – are not maintained, the reviews will become prolonged. Every effort should be made to maintain personnel stability within a project for the duration of the combined license review and plant construction.

The majority of the existing 103 reactors in the U.S. are unique design. Standardization was not a consideration in the early plants, where incorporating lessons learned as previous plants were built took priority. In the 1990s, the industry made a commitment to standardize new plants to the fullest extent possible. As a result, once the first plant receives its license, subsequent licensing activities for future plants of the same design should be easier and take less time. The only issues to review would be associated with site-specific differences and design compatibility with the site.

The industry commends the NRC for moving forward with improvements to 10 CFR Part 2, *Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders*. These improvements will make the licensing process more objective and efficient, while maintaining full public involvement on issues that are relevant and germane to the proceedings. When coupled with the new Part 52 process, these regulatory and process improvements should assure that a combined construction and operating license for a completely new design can be issued in 24 months of the application being filed. For subsequent application of the same design, the licensing review and process should take no more than 18 months. This timeframe assumes that all the elements of the Part 52 process are being used (an approved early-site permit, and a certified design) and that there is no need for a formal adjudicatory hearing.

In response to the COL solicitation, three consortia applied for assistance from DOE. The three consortia include a team composed of Dominion, AECL of Canada, Bechtel and Hitachi; a team composed of the Tennessee Valley Authority, General Electric, Bechtel and

USEC; and NuStart Energy Development, which includes Constellation Energy, Duke Energy, EDF International North America, Entergy Corporation, Exelon Corporation, Southern Company and the Tennessee Valley Authority, as well as General Electric and Westinghouse.

NuStart Energy Development

As noted above, NuStart includes nine participating companies. Of these companies, TVA is a limited participant, providing in-kind services only, while GE and Westinghouse serve as subcontractors to the formal LLC.

The total cost of the project is just over \$800 million over a seven-year period. We are requesting that DOE provide one-half the cost. Each of the six power companies will provide \$1 million cash annually for five years from 2004 through 2008, and reduced amounts in 2009 and 2010. In addition, each of the six power companies will provide in-kind services throughout the seven-year duration of the project, for a total project share of \$6.2 million of cash and in-kind services from each of the six power companies. The reactor vendors will provide significantly greater funding – Westinghouse approximately \$208.3 million and GE approximately \$157.2 million – over the course of the project.

The NuStart Energy Development proposal is divided into three overlapping phases: Planning, Evaluation and Licensing. The significant activities of each phase are outlined below:

Planning Phase (2004-2005)

- Finalize consortium organization
- Finalize contractual relationships
- Prepare for design selection
- Identify candidate sites
- Develop general licensing strategy

Evaluation Phase (2004-2005)

- Develop design selection criteria
- Select site
- Finalize licensing strategy
- Reevaluate economic evaluation for nuclear investments

Licensing Phase (2004-2010)

- Receive from NRC Design Certification for selected designs
 - Westinghouse AP1000
 - General Electric ESBWR
- Issue Request for Proposal to reactor vendors
- Select reactor design for submittal
- Submit COL application to NRC
- COL granted by NRC

Prerequisites to New Plant Construction

As defined by DOE, the scope of the NuStart Energy Development proposal is limited to the pursuit of a combined operating license. The consortium has made no commitment beyond obtaining the operating license. While the consortium, or members of the consortium, would be able to use the COL to pursue construction of a new plant, there is no commitment to build a plant once the COL is obtained.

Successful completion of the proposed COL project will address two of the main areas of risk associated with new nuclear investments – lack of regulatory predictability and lack of completed designs to allow for accurate estimates of construction and operation cost. The industry expects to develop significant information regarding cost estimates of new plant construction and operation through the COL process. However, the issue of regulatory uncertainty remains a concern for those companies interested in pursuing new plant opportunities. The financial community has stated that it considers regulatory predictability and stability to be prerequisites to obtaining funding for a new nuclear power plant, and continued Congressional attention toward future regulatory stability and the licensing of new plants will help build confidence among investors and within the industry.

In addition to mitigating the risks of regulatory predictability and design completion, other pre-conditions are necessary before new nuclear investments can be made:

- (1) Congress and the Administration must fully fund the Nuclear Power 2010 program at \$80 million for fiscal year 2005, and DOE must commit to fund the program at levels that will sustain it to meet the above mentioned targets by 2010.

- (2) The industry must continue to ensure outstanding performance of the current fleet of operating reactors. Recent trends indicate that the industry is succeeding: performance and safety indicators are at record levels. For instance, nuclear plant capacity factors averaged 90 percent, the highest of any source of electricity generation. Public perception of new nuclear power is based, in part, on the

performance of the current fleet of operating plants. Thus, continued solid industry performance is essential to maintain the confidence of the regulators, the financial community and the general public.

- (3) Congress and the Administration must continue to support a clear path forward to resolve the issue of spent fuel disposal. Particular milestones that will signal progress include adequate funding levels for the Yucca Mountain program, the submittal of the Yucca Mountain license application by DOE to the NRC – which is scheduled to occur in December 2004, and the NRC’s timely review of the application.

- (4) Power companies must have confidence that open and competitive wholesale markets for electricity exist. Many power companies are operating in a deregulated environment. Although they no longer need to demonstrate that their investment in new generation is “used and useful,” these companies must have confidence that there will be a consistent market for the power. The ideal solution to this issue is to have a power purchase agreement in place for the sale of the proposed project’s output, at least for the early years of production. In addition to alleviating the uncertainty regarding the need for the additional power, the power purchase agreement would remove the risk associated with price fluctuations by establishing a price schedule for the output. The power purchase model is used extensively in the wind generation business. In the absence of a power purchase agreement, very high confidence in the projections for demand growth and market prices will be needed for companies to consider investing in new nuclear plants.

(5) Congress and the Administration must support incentives to alleviate concerns by the financial community concerning the risks associated with being a “first mover” in the construction of new plants. These incentives are particularly important given the significant capital investment required for nuclear construction. A number of financial incentives have been identified by the industry New Plant Task Force in conjunction with the Department of Energy. Some of the incentives being considered include:

- Insurance against substantial cost increases or cancellation resulting from the regulatory process
- Low interest government loans or loan guarantees
- Seven year depreciation schedule
- Investment tax credits
- Production tax credits
- Protection against electricity price fluctuations, especially for the early years of plant operation

A successful and sustainable program to build new nuclear plants in the United States does not require all of the above incentives. Various combinations or even a portfolio approach which caps the value of the incentive could be used.

It is important to emphasize that the industry is not seeking a totally risk-free business environment. Rather, it is seeking government assistance to contain those risks that are beyond the private sector's control. The goal is to ensure that the level of risk associated with the next nuclear plants built in the United States generally approaches what the electricity industry would consider normal for a commercial project.

There is ample precedent in other areas for this type of government support for critical infrastructure. The Transportation Department's Transportation Infrastructure Finance and Innovation Act (TIFIA) is just one example. The TIFIA was developed to address a similar scenario where major investments in bridges and tunnels were needed for the common public benefit, but the construction projects were not attractive enough for individual entities to pursue. The incentives within the TIFIA framework were developed to stimulate private capital investments using limited government funds.

Summary

Nuclear power will play a critical role in allowing the nation to meet its future energy needs while preserving a sound environment. Not only is nuclear power a safe, reliable and economic source of electricity – allowing it to meet the nation's future need for baseload power generation, it is also the only major emissions-free source of generation currently in operation. While aggressive efforts must be made to explore and expand other forms of environmentally responsible generation, including wind, solar, biomass, natural gas and clean coal, the U.S. must also take steps today to ensure that the nation will enjoy the benefits of a new generation of nuclear plants in the future.

Congress and the Administration should fully fund the Department of Energy's Nuclear Power 2010 Initiative, take steps to assure a stable regulatory environment, continue to support work on the Yucca Mountain project, and provide financial incentives for the construction of the first series of new nuclear plants that are built.

Marilyn C. Kray
Vice President, Project Development
Exelon Nuclear

Marilyn C. Kray is the Vice President, Project Development for Exelon Nuclear. In this capacity, she is responsible for all Company activities related to advanced nuclear reactors. She is also the lead of NuStart Energy Development, LLC, an industry consortium formed to pursue a Combined Operating License for a new nuclear plant in the U.S.

Prior to this assignment, she was Vice President of Nuclear Acquisition Support and Integration within the Exelon Nuclear organization. In this role, she was responsible for the acquisition and integration of nuclear power plants by AmerGen, a joint venture between Exelon and British Energy, and for the operational support of various Exelon generation and development projects. She was responsible for the development and implementation of the Exelon acquisition processes. She pioneered the internal processes for due diligence and plant transitions by successfully completing the purchases of Clinton Power Station in Illinois, Three Mile Island, Unit 1 in Pennsylvania and Oyster Creek in New Jersey.

Mrs. Kray joined PECO Energy Company (prior to its 2000 merger with Unicom to form Exelon) as an Engineer in 1987. She was later promoted to Manager of Licensing for Peach Bottom Atomic Power Station. Her primary responsibilities included managing the interface between PECO Energy and the U.S. Nuclear Regulatory Commission (USNRC). Mrs. Kray served a two-year rotational assignment in the Customer Service organization where she was the department's lead for the development of the deregulation pilot program to implement customer choice.

Prior to joining Exelon, Mrs. Kray was a Reactor Engineer with Region I of the USNRC. In this role, she performed independent and team inspections of power reactors. She also served as a Project Manager with the USNRC Office of Nuclear Reactor Regulation where she was responsible for the USNRC initial licensing review of various plants. She was the recipient of the USNRC Special Achievement Award.

Mrs. Kray is a graduate of Carnegie-Mellon University, with a Bachelor of Science degree in Chemical Engineering. Through successful completion of extensive simulator and training courses, she has been certified by the USNRC to perform power operations inspections at nuclear reactor facilities. She has also completed various finance and leadership development programs at Harvard, MIT and Wharton.

Mrs. Kray has served in leadership roles as the Company representative to various industry groups including the Pennsylvania Electric Association, the Edison Electric Institute, the Boiling Water Reactor Owners Group and the Nuclear Energy Institute. Additionally, she has been an active volunteer in community organizations, including serving as President of the East Pikeland Home and School Association and referee for the Phoenixville YMCA basketball program.

Mrs. Kray was born in Pittsburgh, PA and makes her home with her husband and two sons in Kimberton, PA.