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Hearing on "Charting the Course for American Nuclear Technology: Evaluating the Department of Energy's Nuclear Energy Research and Development Roadmap"

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Good morning Chairman Gordon, Ranking Member Hall, and Members of the Committee. My name is Gary Krellenstein, and I am a Managing Director in the Energy and Environmental Group at JPMorgan Chase. I appreciate the opportunity to testify today on the Department of Energy (DOE)'s Nuclear Energy Research and Development Roadmap ("the Roadmap").

My areas of focus are utilities, energy technologies and project financing. I have previous experience as a utility and energy analyst at Lehman Brothers and Merrill Lynch, and as nuclear engineer and systems analyst at EnviroSphere Company (a subsidiary of EBASCO), the U.S. Department of Energy and the U.S. Nuclear Regulatory Commission. I hold degrees in Nuclear Engineering, Computer Science and Business Administration. I have also been ranked multiple times as one of the top financial analysts in the nation by *Institutional Investor Magazine* (1st team for 12 consecutive years), the *Bond Buyer*, *Global Guaranty*, and *Smith's Research and Rating Review.*

My firm, J.P. Morgan, is an industry leader in underwritings, financing and advisory work to electric utilities and energy companies in the United States. In 2009, J.P. Morgan underwrote more than $11 billion of debt just for electric utilities, and has been involved in hundreds of power-related projects over the past few years.

I will focus my testimony this morning on the cost and financing related issues of Small Modular Reactors (SMRs), and the potential for the DOE's Roadmap to improve the investment fundamentals of nuclear power in the United States.

The smaller size and cost of SMRs give them several distinct advantages over what I'll call conventional nuclear reactors. But first let me provide a bit of context. For many people, when they think of financing large industrial or energy facilities, they assume that it will be done on a "project" finance basis (i.e. where a loan is repaid from the revenue generated by the asset being financed). And for a limited number of power projects where the technology, capital costs and construction risks are relatively low – for example a simple cycle gas unit —this type of financing is often utilized.

But in practice, large power assets—particularly conventional nuclear plants where the costs can be in the range of $15 billion for a new twin unit project — usually have the financing backed by the full faith and credit of all the company assets' and net revenues (referred to as "system" financing) — and are not secured solely by the specific project being financed.

So what does this mean for the investment fundamentals of SMRs, - well, three things:

First, the construction of SMRs requires less capital, due to their size and other attributes, than conventional nuclear power plants. Second, the smaller capital requirements would allow a single company to build an SMR as opposed to the large and diverse consortium that can greatly complicate investors' required due diligence as well as their analysis of the management structure of what is already a complex undertaking. Third, the financing for large conventional nuclear plants require utilities to bear significant default risk such that the construction of each plant is essentially a 'bet the

company' event. Many utilities are not willing to finance such a large project. Let me take a few moments expand on these issues.

As a practical matter, it is easier to find buyers for $2 billion worth of securities than it is to find buyers for $15 billion. While that's obvious, SMRs substantially lower cost will make raising capital easier and, one would expect it to provide greater issuer (utility) comfort that sufficient investors can be found at a reasonable price.

In addition, the lower cost of SMRs has the potential to simplify investor analysis. The current enormous cost and very large capacity (MWe) of new conventional nuclear plants has required multiple partners to come together to finance a single project. And often these partners have significantly different degrees of creditworthiness. Given the variability of credit ratings and differences in capital structures, performing due diligence on such a consortium is vastly more complex and, as a result, more expensive to finance because of the corresponding increase in uncertainty.

Moreover, any financial consortium is only as strong as its weakest member, which can raise costs for more creditworthy participants, thus pushing up costs of the entire project. Furthermore, the interrelationship and ability of the group to work together without discord is also a major credit factor for investors, and was the cause of many of the difficulties encountered in the last round of nuclear plant construction in the 70s and 80s.

And closely related to the consortium complexity I just discussed, is the default risk posed to a particular company or entity. The size of conventional nuclear reactors necessarily implies that if the project fails, so may the company. This "bet the company" reality persuades many private and public power

generators to prefer other power technologies that don't pose an extinction risk to the company. In theory, SMRs should substantially simplify potential investors' analysis as well as reducing the default risk to the power companies building them.

Furthermore, there are capacity attributes of SMRs that make them more attractive to utility companies as a cost effective means of addressing smaller increases in energy demand and the uncertainties associated with forecasting of local energy needs. SMRs scalable size and easier sitability, particularly if located adjacent to or at an existing nuclear facility, makes them a plausible alternative to building gigawatt sized nuclear power stations, which is currently the only option. If SMRs are technically validated, and the procedural risks mitigated by Congress and the Administration, it should increase the ability of both utilities and investors to participate in nuclear projects.

I applaud the Department of Energy for their acknowledgment of the potential of SMRs in the Nuclear Energy Research and Development Roadmap. Reduced capital requirements, expected improvements in quality control due to modular design, and a potentially simpler issuer structure (one or two parties instead of a large consortium) will be major factors in the reduction of the financial risk profile, but will probably be insufficient to overcome investor concerns associated with a new commercial reactor design. A demonstration project will likely be needed to further mitigate investors concerns over the technological risks associated with SMRs and could help to catalyze a nuclear renaissance. In addition, clearly-defined federal financial support for SMRs is essential to mobilize private sector capital. New technology of any kind can sometimes struggle to raise capital and this challenge is accentuated in the nuclear context. I urge Congress to move forward on legislation that proposes cost-sharing programs for SMRs.

However, beyond these obstacles, there remain political and regulatory uncertainties that need to be addressed. The NRC's permitting processes is currently too long and unpredictable for many investors. It is unclear if the regulatory process can be streamlined for SMRs, but there should be some licensing synergy if they are located adjacent to existing nuclear power plants and/or constructed as identical modular units.

In conclusion, there are three major financial advantages for SMRs: lower capital requirements, the likelihood of sole-party financing, and a reduction of the significant default risk for utilities normally associated with traditional large nuclear facilities.

The Roadmap is laudable for its recognition of the potential for SMRs to overcome many of the obstacles that have previously hindered private financing for domestic nuclear facilities. However, while the Roadmap helps move the needle on addressing technology risk, both political and regulatory variables continue to give pause to investors in this space. Unless addressed, these risks will continue to undermine efforts to promote a domestic nuclear renaissance here in the United States. I appreciate the opportunity to testify before the Committee this morning.

Thank you.