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Contact: Eliot Brenner, 301-415-8200

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**Effective Regulation: The Cornerstone of
Nuclear Power Development Nuclear Industry Congress Africa
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Thank you. It's an honor and a pleasure to be in South Africa, where my parents were born and raised. This country has been dear to me since my childhood, and I'm grateful for this opportunity to return here. I'd also like to thank the conference organizers for recognizing the need to include regulatory voices in this week's discussions.

This is an interesting time for nuclear power. We're seeing new countries, and new regions of the world, expressing interest in adding nuclear to their energy portfolio. I would argue that there's never been a more important time for international nuclear safety cooperation.

My remarks today will focus on the essential role of an independent, effective nuclear regulator, and our collective obligations in ensuring nuclear safety. I'll discuss various principles of effective regulation and provide examples of how the Nuclear Regulatory Commission (NRC) strives to meet them in the United States. I'll address the important role that international cooperation plays in fostering a strong worldwide nuclear safety community. And I'll share some examples of how the NRC has directly benefitted from international experience and sought to share those benefits with others.

While I'll discuss regulatory effectiveness mainly as it relates to new nuclear power programs, it's important to recognize that many countries use nuclear materials for other peaceful purposes in medicine, industry and agriculture. And while nuclear power often gets the most attention, effective regulation is important regardless of the type of nuclear material, or how that material is used.

To that end, I'd like to begin by recognizing the important nuclear safety cooperation that African regulators have undertaken through the Forum of Nuclear Regulatory Bodies in Africa (FNRBA). The NRC has had the privilege of participating in several of the Forum's meetings and activities. I commend the Forum as an outstanding example of effective regional cooperation. I'm proud to call it and its individual members the NRC's partners in strengthening nuclear safety and security worldwide.

Now I'd like to put effective regulation of a civilian nuclear power program into context. Worldwide electricity demand is on the rise, and countries continue to seek alternatives to fossil fuel.

The U.S. Energy Information Administration projects that worldwide energy consumption will grow by 56 percent by 2040, with 90 percent of the increase in non-OECD countries.¹

It's therefore not surprising that, in places where large portions of the population live without electricity, plans to expand the grid are met with enthusiasm. The justification for quickly expanding access to electricity can be especially compelling. New sources of power can bring electricity, but also improved food safety and increased access to safe drinking water. They can improve interconnectedness between geographic areas and enhance business performance. They can even boost an economy if they generate enough excess energy to export.

But the benefits that these factors can bring to a country are sure to be short-lived if sources of power are unreliable. To protect public health and safety, and ensure that the country derives maximum benefit from the technology, every country with a nuclear power program must have an independent, effective regulator.

To be truly independent, the regulatory body must be separate from the political and economic pressures associated with promoting nuclear power. In the United States, the NRC is the independent nuclear safety and security regulator. But it wasn't always that way. The Atomic Energy Commission (AEC), established in 1946, initially oversaw both promotional and regulatory activities in the United States. By the early 1970s, increasing concerns emerged about whether the AEC was effective, or objective, with its dual responsibilities of developing and regulating nuclear power. The need for a separate organization, whose sole concern was safety and security, separate from political and economic influences, became apparent. In 1974, the U.S. Congress passed the Energy Reorganization Act, which established the NRC as it's organized today.

A country considering developing and regulating nuclear power should ideally establish an independent regulatory infrastructure early, before decisions are made regarding reactor design or location. This infrastructure must address the fact that some amount of risk is inherent in using nuclear technology for any purpose. The public must be adequately protected and informed accordingly. In establishing security requirements, those considering nuclear technology must also consider the fact that nuclear material must not fall into the wrong hands. In the United States, responsibility for both civilian nuclear safety and security fall under the NRC's jurisdiction. This system is effective for us, as we believe that both are high priorities that require coordination.

Let me expand on the issue of priorities. A nuclear regulator must be independent, but simply being separated from promotional activities on an organization chart isn't enough. The regulator must be adequately funded and staffed with highly-competent subject matter experts. It must have the authority to stop an activity if it identifies a safety concern, even if it means that a project is delayed. It must be able to shut down a plant that's not operating safely, even if it means a population is temporarily deprived of electricity.

To have this authority, a regulator must have the ability to make truly independent safety decisions, with the confidence that those decisions won't be overturned for political reasons. Put another way, safety and security must be the entire government's priorities.

¹ EIA International Energy Outlook 2013: <http://www.eia.gov/forecasts/ieo/>

An effective regulator's vigilant efforts to protect public health and safety may identify challenges that must be addressed in the advancement or use of nuclear power. Because of this, regulators are sometimes viewed as an impediment to progress – a bureaucratic hurdle that slows things down. Indeed, the opposite is true. Rather than hindering a country's ability to employ peaceful uses of nuclear technology, effective regulation enables the country to do so efficiently, safely and securely. It reduces uncertainty, protects against delays and contributes to a country's non-proliferation goals by preventing diversion of nuclear material.

In my view, the best way for a regulator to build public credibility is by ensuring that regulatory decisions are made openly, with opportunities for public input.

We often reference the terms “openness” and “transparency” when discussing regulatory effectiveness. Though sometimes used interchangeably, these terms describe different actions – and both are important.

“Transparency” reflects the regulator's efforts to create practical, coherent regulations. Agency positions and actions should be publicly documented, readily understood and easily applied. A transparent regulator has mechanisms in place to give the public access to records of its decisions and other information relevant to nuclear safety. The regulator should present a clear nexus between regulations and agency goals and objectives.

“Openness” is achieved by providing opportunities for meaningful public participation in regulatory processes. For the NRC, U.S. law requires this. Nuclear regulation is the public's business, and it must be transacted publicly and candidly. Open channels of communication must be maintained with lawmakers, other government agencies, licensees, the public and the international community. This input is critical to informing the regulator's work and ensuring that “independent” doesn't mean “isolated.”

In the United States, when regulations are created or revised, the public must have opportunities for comment. Depending on the circumstance, the NRC holds public meetings designed to hear first-hand from interested parties, and also solicits written comments. We also use various tools available to us through the internet to share information with the public, including our website and social media outlets.

An equally important aspect of effective regulation is avoiding complacency. A regulator must routinely evaluate its performance and make appropriate improvements. This involves looking within an organization and outside it. And since I became NRC Chairman in 2012, one of my highest priorities has been enhancing the NRC's public engagement. In particular, I feel that our agency can do more to cultivate the kind of two-way dialogue I just mentioned, and we are striving to do so.

Let me use this idea of continuous improvement to transition to another important aspect of effective regulation – collaboration with international counterparts. This is particularly important for new regulators. The international regulatory community works to advance common nuclear safety and security objectives. These activities take place at bilateral, regional and multilateral levels. Learning from one another's experiences by discussing various approaches to common issues is one of the most effective ways to ensure continuous improvement.

From a multilateral perspective, any country considering establishing a nuclear power program should actively participate in the Convention on Nuclear Safety. The Convention process provides for thorough, candid peer reviews of each country's nuclear safety activities. Countries receive peer feedback on how they've improved in areas that previously fell short of meeting Convention objectives. The NRC has benefitted greatly from these multilateral interactions.

Regionally, smaller group sizes allow for more in-depth discussions. Depending on the area, countries may face similar, or very different, geographic, political, or economic circumstances. For countries in similar situations, regional discussions can bring to light a variety of ways to handle the same issues. For countries in a diverse region, regional interactions can help identify ways that countries can assist one another. As the African regulators' forum has demonstrated, bringing a diverse group of countries from the same region together allows countries to discuss ways of addressing issues they may not have otherwise considered.

Bilaterally, regulators reach a greater level of technical depth in their interactions. Again, countries may be drawn together based on their similar or different backgrounds. These interactions can result in mutual learning or in providing assistance, each of which can be beneficial.

The NRC has active bilateral cooperative agreements with more than 40 countries. Many of these have been in place since the NRC was established. These agreements allow for cooperation and assistance in nuclear safety, physical security, material control and accounting, waste management, environmental protection, and other areas.

Under the agreements, the NRC and its regulatory partners meet regularly on a variety of technical issues. We also enable our staffs to spend several months to a year in one another's regulatory organization.

Over the years, the information the NRC has received through international cooperation has made critical contributions to our regulatory program. When the Davis-Besse nuclear power plant in the United States experienced pressure vessel head corrosion, we considered operating experience from France on how its regulator and industry addressed a similar problem.

We routinely work with countries with similar power plants to those in our own fleet, such as Japan and Mexico, to share information on how we've handled issues like large component replacement and power uprates. More recently, we've worked with China, Korea and Finland to gain important insights into new nuclear power plant construction. And, as several reactors in the United States have recently shut down, we're also working with regulatory counterparts in Germany, Canada, Sweden and the United Kingdom on issues related to decommissioning and handling spent fuel.

The NRC defines "assistance" activities as those in which we provide guidance to regulators seeking to develop their organizations or enhance their oversight. We conduct assistance work both with technical staff and through financial contributions to the International Atomic Energy Agency (IAEA). We coordinate closely with the IAEA to ensure that our bilateral assistance efforts complement the IAEA's multilateral activities with these countries.

The NRC's assistance activities span the globe, and many are focused on radioactive source safety and security under a program called the Radiation Sources Regulatory Partnership. In the past

year, this work has brought NRC staff and contractors to Africa, Latin America, Central Asia, the Middle East and Europe.

Our International Regulatory Development Partnership focuses on regulatory development for countries considering nuclear power programs. The program has undertaken a number of recent activities in Africa. These include: a workshop on construction and vendor inspection techniques for ten countries in the FNRBA; workshops on developing high-quality nuclear executives in Ghana and South Africa; reactor safety courses in South Africa; and a workshop on siting application reviews in Tunisia.

For countries in the initial stages of establishing a regulatory infrastructure, the process may seem daunting. But this is a positive time for regulatory development and cooperation. Countries have the opportunity to consider lessons learned by existing regulators and implement them into their own programs at the ground level. Governments, as a whole, must make independent regulation a priority as they consider nuclear power. Ensuring independence at the outset can be much simpler than separating a regulator from within an existing organization at a later time.

Similarly, I believe that countries considering nuclear power programs should consider how nuclear waste will be stored before they ever produce it. There is an active, open international dialogue on this issue that can only benefit from additional perspectives. Garnering public support for nuclear waste disposal plans and policies is especially important.

In addition, any country seeking to add nuclear power to its energy mix would be best served by building indigenous regulatory and operation capabilities. Even the most capable foreign regulator or operator cannot achieve the same levels of safety and effectiveness if the expertise resides in another country.

Nuclear safety is a collective responsibility – regulators shouldn't do it alone. Without similar commitments from industry, government, and the financial community, nuclear safety won't be as strong as it needs to be.

Several weeks ago, I spoke to a group of investors and industry representatives in the United States. My message was that effective regulation must be a business consideration. Investors should consider the presence of a strong, independent regulator as a country's commitment to nuclear safety. A gentleman in the audience expressed the view that "nuclear safety is only as strong as its weakest regulator." I was struck by the way he so aptly summarized the critical reason for our international engagement. Regulators should be evaluated against the criteria of effective regulation I've described today. An unwavering commitment to safety and security by the regulator and the regulated community is critical to the success of any nuclear power project.

Countries in Africa and elsewhere continue to consider whether to include nuclear power in their energy mix, and how to go about it. It's essential that establishing an effective regulatory infrastructure remains a high priority for everyone.

I greatly appreciate the opportunity to speak to you today, and I look forward to our panel discussion. Thank you.