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“Regulatory Perspectives on Nuclear Safety”

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Introduction

Good morning. I am delighted to have an opportunity to participate in Nuclear Energy Asia 2010. A reliable energy supply is essential to the quality of life in our societies irrespective of location. Many countries throughout the world are facing increased demands for reliable energy. This is indeed true in Asia which hosts several of the world’s fastest growing economies.

Over the last decade or so, nuclear energy has become an increasingly popular option for some countries seeking to reduce their carbon emissions and dependency on foreign oil. Despite the global financial crisis over the last two years, there still appears to be significant interest in nuclear power worldwide. Hence, many observers have considered this period of renewed interest in nuclear energy to be a “nuclear renaissance.”

According to the most recent data in the International Atomic Energy Agency’s (IAEA) power reactor information system, there are about 65 nuclear power reactors under construction in 15 countries worldwide. This figure has nearly doubled in the last two and a half years. I think it is worthwhile to note that 26 of these reactors under construction are in China, 6 in India and 5 in South Korea. It is important to also note that Vietnam, Indonesia, Thailand, the Philippines and Malaysia are considering a nuclear component to meet their future energy needs. Thus, this conference serves a real need for all of us to more closely examine important issues vital to the entire world community.

Note: [click here](#) to view corresponding slides for Commissioner Ostendorff’s presentation.

The rising interest in new and expanding nuclear power programs presents both challenges and opportunities for the global nuclear community. As countries with existing nuclear power programs know, the promise of nuclear power can only be realized through an unwavering commitment to nuclear safety.

Within this context, what I would like to do this morning is to share with you regulatory perspectives in three key areas that I believe are relevant to countries seeking to expand or introduce a nuclear power program. These areas are the need for a strong safety culture, the importance of a credible regulator, and the value of international cooperation.

Before I begin, let me make two points of clarification. The first point is that my remarks will be focused on nuclear safety in general. The second point is that I am but one member of the five-member United States Nuclear Regulatory Commission (US NRC). Therefore, my remarks today represent my personal views as an individual commissioner.

The Need for a Strong Safety Culture

The first key area I would like to address is the need for a strong safety culture. A nuclear power program can have a lifetime of up to 100 years or more when considering years of plant construction, operation, and decommissioning. Such a venture requires the establishment and maintenance of a sustainable national nuclear safety infrastructure. By infrastructure, I am referring to the institutional, organizational, legal, and technical frameworks that provide a solid foundation for ensuring a high level of nuclear safety throughout the lifetime of the program. Within the national nuclear safety infrastructure, I believe that a strong safety culture is the key foundation. Without this one essential cornerstone – a strong safety culture – nothing else matters. Let me expand upon this a bit.

Operational experience has shown that reliance on a robust design and engineered safety systems alone is insufficient to ensure nuclear safety. I think this point is particularly relevant in light of the new reactor designs with enhanced safety features being introduced into the market today. Nuclear safety laws and regulations by themselves, while necessary, are not alone sufficient to ensure safety. A nuclear power plant is operated by people. Thus, the achievement of safety requires qualified operators, managers, and executives with an appropriately embedded safety culture. In my view, this most important component is also the most difficult one to acquire. And, it does not come into being “overnight.” The creation of a strong safety culture requires persistence, hard work, and a life-long commitment. Decades of experience in the nuclear field have shown that regulators have to do more than simply establish standards. Rather, I believe it to be more appropriate for a regulator to establish a high-level expectation or policy to help foster the development and maintenance of a strong safety culture.

So what is safety culture? While there is no universally accepted definition, it generally refers to the attitudes, behaviors, and conditions that can affect safety. The USNRC’s 1989 “Policy Statement on the Conduct of Nuclear Power Plant Operations” refers to safety culture as “the necessary full attention to safety matters” and the “personal dedication and accountability of all

individuals engaged in any activity which has a bearing on the safety of nuclear power plants. A strong safety culture is one that has a strong safety-first focus.”

But, mere definitions or descriptions alone do not suffice to fully explain what this “safety culture” is. Let me offer a few concrete examples of indicators of the safe operation of commercial nuclear power plants:

- Thorough pre-shift briefs for operators that cover all expected, and unexpected but possible, events for the upcoming shift;
- Detailed plant tours by supervisors who talk to operators and operators who in turn share their safety observations with supervisors in an environment that encourages two-way communications;
- Management personnel observing maintenance practices, inspecting for proper procedural compliance and use of appropriate quality assurance practices;
- Requirements that operators meet high training standards and demonstrate technical competence through a rigorous examination process that is held to the utmost standards of integrity;
- Finally, an atmosphere in which any operator can say, “STOP, I am uncomfortable with what is happening or I do not understand the plant conditions I am observing.”

Another excellent example of a healthy and desirable safety culture in the United States commercial nuclear industry was the identification of reactor coolant system leakage at the South Texas Project Unit 1 reactor in 2003. In this example, the license holder identified white residue at two of the 58 instrument penetrations on the bottom of the reactor vessel. The white residue was determined to be boric acid deposits due to leakage from the reactor coolant system.

The boric acid deposits were small in size and amount, and could have easily been overlooked, but they were not. Instead of stopping, the license holder took additional steps to remove access panels in the insulation to perform voluntary inspections. Further examination and testing by the license holder found cracking at the two instrument penetrations with boric acid deposits. In addition to repairing the two leaking penetrations, the license holder also examined all of the other penetrations for evidence of cracking. The technical details of this example are not important. What is important is the questioning attitude, the culture within that nuclear power plant organization that led the utility to take steps to find the root cause of the abnormal indication. A strong safety focus led to the identification of an important material degradation issue.

To elaborate further on the concept of safety culture, let me share some thoughts from a recent event I attended. Last month, I attended a conference hosted by the Institute of Nuclear Power Operations (INPO) where Captain Chelsey “Sully” Sullenberger gave a keynote address. For those of you who are not familiar with Captain Sullenberger, he is the US Airways pilot who successfully landed a commercial passenger jet in the Hudson River near New York City in January 2009 after the jet suffered a complete loss of thrust in its engines due to bird strikes after takeoff.

In his keynote address, Captain Sullenberger reflected upon how his personal commitment to continuous learning, integrity, and teamwork helped to save the lives of all 155 passengers and

crew. Continuous learning – learning not only from one’s own experience, but also from the experience of others. Integrity – doing what is right even when it is not convenient, and doing so when no one else is around. Teamwork – having a shared, clearly understood goal and working together to achieve that goal.

I think these types of positive behaviors, among others, are present in strong safety cultures. Without these attributes, putting the concept of “safety culture” into practice – nothing else matters – not even the safest reactor plant design imaginable.

The Importance of a Credible Regulator

The second key area that I will address is the importance of establishing a credible nuclear regulator. This is indeed another critical element of a successful national nuclear safety infrastructure.

While the overall safety performance of the global nuclear industry has significantly improved since the era of the 1979 Three Mile Island accident and the 1986 Chernobyl accident, it is essential that the nuclear industry and safety regulators around the world maintain their focus and attention on safety. Nuclear power is unique and imposes special requirements on both the nuclear utility and the regulator. None of us in this business can ever become complacent.

I believe that a credible and independent regulator is a vitally important factor in laying the foundation for a strong safety record in any industry. Along these lines, a recent report from the Organization for Economic Cooperation and Development (OECD) Nuclear Energy Agency (NEA) caught my attention. The NEA report showed a significant correlation between the trust in regulators and the belief that nuclear power plants can be operated safely, as well as a strong correlation between public trust of the nuclear industry and public trust in the regulator. This should be intuitively obvious but has special significance for those countries considering developing a nuclear program.

To be credible, I think that a regulator must demonstrate effectiveness in how it conducts its business. At the US NRC, we use our guiding *Principles of Good Regulation*, which are independence, openness, efficiency, clarity, and reliability. I think these guiding principles have served us well over the years. Let me touch on one of these specific principles – that of independence. I consider independence to be a fundamental attribute of an effective regulatory body. A nuclear safety regulator must be independent from the utility license holder and other entities so that it is free from undue pressure from interested parties in its safety decision making. We owe nothing less to the public we serve in our respective countries. As regulators, we need to be informed and we need to engage with industry. But, at the end of the day, we have to be willing to make hard decisions that may not be popular with the regulated industry.

Earlier, I mentioned that nuclear power is unique and carries special concerns. In this regard, another challenge that nuclear safety regulators face is in the area of risk communications and outreach with the public. As professionals in a highly technical field, we tend to be more comfortable communicating in technical terms. However, that is usually not the best way to get our

messages across to the public. I think that regulators and the nuclear industry have different but complementary responsibilities for effective communications with laypersons and outreach with the general public.

From the nuclear regulator's perspective, I think the communications goal is to promote the understanding of the risks associated with nuclear technologies and the bases for regulatory actions. In doing so, the regulator needs to ensure that the public, who may not have a technical background, easily understands the messages in the context of other risks accepted every day. The nuclear industry has a similar responsibility.

During this year, I had opportunities to visit the Leibstadt nuclear power plant in Switzerland and fuel cycle facilities in France and the United Kingdom. I was encouraged to see that these facilities were proactive in providing tours and information to the interested public and officials in the local areas. These are very important opportunities for building lasting relationships with the local community and enhancing the public's awareness of what "nuclear power" is all about.

The collective focus on safety, good communications, and meaningful outreach can help the nuclear industry and the safety regulator to build and maintain public confidence in the safe operation of nuclear power facilities. Building public confidence in the regulator is essential.

The Value of International Cooperation

Let me now turn to the third key area I will address – the value of international cooperation. The interest in new and expanding nuclear power programs provides a great opportunity to build upon and enhance international cooperation within the global nuclear community. This conference is a prime example of beneficial international cooperation.

The users of nuclear power in an individual country are clearly linked to the safety performance of other nuclear users around the world. It is well understood that a major nuclear power plant accident anywhere in the world would present a major challenge for the global nuclear industry and nuclear safety regulators worldwide.

Collectively, the world has over fifty years of combined experience with commercial nuclear power. Accordingly, there are many insights and lessons learned in nuclear safety to be shared within the global nuclear community. I understand that the Asian Nuclear Safety Network (ANSN) was launched in 2002, through the support of the International Atomic Energy Agency (IAEA), to collect, analyze, and share nuclear safety knowledge and experience among the member countries in the Asian region. I think international knowledge management initiatives by ANSN are effective tools for mutual learning in nuclear safety.

The learning opportunities in the international nuclear community are not, in my view, only reserved for those seeking to introduce a new nuclear program. To the contrary, countries with mature nuclear power programs not only have knowledge to share, but also have much to learn. Let me share a personal example. Given the interest in constructing new reactors in the United States, I

recently visited a new reactor under construction at the Flamanville facility in France. Later this week, I will be visiting new reactors under construction at the Sanmen facility in China and the Shin Kori facility in South Korea. These opportunities are of great value in facilitating my understanding of the complexities and policy issues related to the proper construction and safe operation of new reactors.

I should also mention that during October of this year, the USNRC hosted an Integrated Regulatory Review Service (IRRS) peer review mission organized by the IAEA. As you may already know, the IAEA offers IRRS missions to countries to review and assess regulatory programs in comparison to international standards and good practices using a team of international regulatory experts from many different countries. I think these types of peer review activities provide for effective information sharing and learning at the international level, thereby bringing benefits to all those who participate. I especially encourage those countries considering nuclear power for the first time to take advantage of peer review mechanisms.

There are also many ongoing international efforts, bilateral and multilateral, aimed at assisting the safe and secure introduction of nuclear power in so-called “new entrant” countries. The US NRC is a key player in several of these efforts. Additionally, international organizations, such as the IAEA and the Nuclear Energy Agency, provide valuable contributions in this regard. Notwithstanding, I find it necessary to emphasize that assistance from other countries and international organizations should not, in any way, alleviate the safety responsibility of the new entrant country. The primary responsibility for nuclear safety always rests with the operator or license holder.

Let me touch on one more aspect of international cooperation that I think is worth discussing in the context of new entrant nuclear power programs. Given the multinational nature of today’s nuclear business and activities, the safety success of a nuclear power program in a new entrant country necessarily involves governments, regulators, vendors, and/or utilities from other countries. I believe each of these entities in the supply and support chain have a role in helping to ensure that a new entrant establishes and maintains a sustainable nuclear safety infrastructure. For example, vendors and suppliers of nuclear reactor technologies should seek to ensure that their customers fully understand the designs and operational characteristics of their products so that the nuclear power plant will be operated safely under all configurations.

Continued international cooperation among all parties involved in any nuclear venture is vital to ensure that plans for nuclear program development do not move faster than plans for establishing the necessary nuclear safety infrastructure and associated human capacity.

Conclusion

Let me now close. It is essential that countries seeking to expand or introduce nuclear power programs establish a sustainable national nuclear safety infrastructure. I think that a successful nuclear safety infrastructure should have as critical elements a strong safety culture, and a credible and independent regulatory body. It is also imperative that the international nuclear community

continues to cooperate and share its knowledge and experience for the safe and secure introduction and expansion of nuclear power programs. Thank you for your attention.