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Remarks, as prepared, for IAEA Second International Conference on Climate Change and the Role of Nuclear Power: Atoms4NetZero
High Level Panel: Nuclear Safety and Climate Resilience

Thursday Oct. 12, 2023

Introduction

Good morning, and thank you, Paolo, for the introduction. As mentioned, my name is Bradley Crowell, and I am the newest Commissioner on the U.S. Nuclear Regulatory Commission. I have served on the Commission for just over a year and I appreciate the invitation from the IAEA to join all of you this week to discuss the important topic of Climate Change and the role of Nuclear Power.

And I am honoured to join such a distinguished panel for our discussion today focused on the nexus of nuclear safety and climate resilience.

And most importantly, I am grateful to all of you who stuck around the conference until today, and to those joining on-line, for participating in the discussion this morning. I know my fellow panellists and I have been looking forward to this dialogue and to your questions.

This week's conference on Climate Change and the Role of Nuclear Power marks my first visit to the IAEA since joining the Commission. And I will readily admit that I chose this gathering focused on climate change intentionally.

I am a strident believer that nuclear energy can, and should, play a critical role in our collective efforts to achieve net zero carbon emissions while enhancing our respective domestic and international energy security goals. However, to fully realize the potential for nuclear energy as a carbon-free, baseload power source, we must ensure the current and future fleet of nuclear

reactors continue to meet the highest standards for safety. In this regard, climate change is creating both opportunity and challenges for nuclear energy.

As we look ahead, all nuclear reactors must be resilient to the impacts of climate change. From the standpoint of a regulatory body such as the U.S. NRC, this means we must ensure that nuclear reactors are licensed and operated in manner that recognizes the impacts of climate change are already upon us. Indeed, as we plan for the years ahead, we must also recognize that climate-related events are intensifying and compounding more quickly than anticipated, and this trend will continue for a period of time before stabilizing and presumably, hopefully abating. This is our reality even if we succeed in bending the carbon curb and achieving net-zero by 2050.

So as we look at the big picture, and from my perspective as a policymaker and regulatory decisionmaker, I view the IAEA's Atoms4NetZero initiative and the focus of today's panel on Nuclear Safety and Climate Resilience as intrinsically linked. Indeed, I believe they are mutually dependent. The benefits of nuclear power, as a carbon-free, baseload power source, can be game-changing for reaching our near, medium, and long-term climate goals.

However, to fully realize these benefits, our current and future nuclear reactor fleets worldwide must be resilient to the intensifying impacts of climate change. Ensuring the safe and resilient siting, construction, and operation of nuclear power reactors in a warming world must be a primary and continuing focus for regulating commercial nuclear power plants if nuclear energy is to become a meaningful, enduring part of our energy future.

To help set the stage for our panel discussion, I will first provide a short overview of the role of the NRC as an independent regulatory agency in the United States with exclusive authority for overseeing the safe application of all commercial nuclear energy facilities and other civilian nuclear technologies.

Second, I will briefly discuss the measures currently taken in the United States to assess and plan for climate impacts in the context of ensuring the safe and resilient operation of America's nuclear fleet. As the regulator of nuclear power in the U.S., the NRC addresses climate change impacts and resilience from two, interrelated perspectives: safety and the environment.

Role of the NRC

As an independent regulatory agency, the NRC plays a critical, but also unique, and nuanced role in our nation's, and indeed the world's, collective effort to address climate change. At the highest level, the NRC's statutory mission is to "license and regulate the nation's civilian use of nuclear materials, to ensure adequate protection of public health and safety, to promote the common defence and security, and to protect the environment." Within that mission, ensuring public health and safety and protecting the environment encompass the largest share of NRC resources.

In the vein of protecting public health and safety, the NRC *licenses* nuclear power plants and provides the *oversight*, enforcement, and regulatory infrastructure for the safe and secure operation of civilian nuclear power. While this regulatory function is distinct from *promoting development and deployment* of nuclear energy technologies – a mission vested with the US. Dept. of Energy – it does embody *enabling* the safe construction and operation of civilian nuclear reactors.

But this doesn't mean the NRC is, or should be, immune from considering climate change in its regulatory decisions. In fact, many key climate related considerations are integrated into the NRC's current safety and environmental efforts as part of the license application review process.

With respect to the NRC's environmental reviews, this process focuses on the *impact that a facility has on the environment*. In contrast, the safety review process is focused on external events and the ability of nuclear facilities to withstand natural phenomena such as hurricanes, flooding, and tornadoes. Events that we all know are increasing in both frequency and intensity due to climate change.

Environmental reviews

I'll start with some background on the environmental review process.

In 2009 the Commission directed NRC staff to begin consideration of greenhouse gas emissions in the environmental reviews for all major licensing actions under the National Environmental Policy Act. These major licensing actions include activities within the uranium fuel cycle as well as construction and operation of nuclear power facilities. Subsequently to this 2009 direction from the Commission, the NRC staff finalized guidance providing the framework for considering various aspects of climate change in the environmental reviews for new reactors – including as part of the cumulative impact analyses and within the reasonable alternatives analysis.

Safety Reviews

Moving to safety reviews, the NRC considers climate-related challenges in licensing decisions by evaluating and requiring protection against natural hazards on a site-specific basis for each nuclear facility. For example, in its safety reviews, the NRC staff evaluates external flooding from various flood-causing events such as storm surge, local intense precipitation, and coastal flooding. NRC also evaluates other natural hazards such as drought conditions, extreme temperatures, and high winds. And of course, non-climate related hazards such as earthquakes.

Within the last decade, the NRC has also updated its safety review process in response to the Fukushima Daichi nuclear accident. Although Fukushima was not a climate induced natural hazard, it nonetheless shed important light on the need improve the resilience of nuclear reactors from natural hazards without historical precedent. This same framework applies directly in the context of climate change as well. The advent of more frequent and intense weather events is happening on an annual basis. And such events are occurring in a wider geographic region than previously experienced and in communities unaccustomed to preparing for such events.

The NRC took a number of actions subsequent to the events at Fukushima Dai-ichi, including developing a new tool called the "Process for the Ongoing Assessment of Natural Hazards Information" (or, "POANHI"). This is a systematic framework that monitors and assesses new and updated natural hazards information to determine if regulatory action is needed.

This tool is still a newer one in the agency's toolset, but it integrates with existing frameworks. The NRC staff recently published a public website with new information on this process on a regular basis.

The NRC has also joined with IAEA on a related project looking beyond the United States called the Consolidated Research Project on Climate Change Challenges to the Safety of Nuclear Installations.

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