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Commissioner Bradley R. Crowell
(as prepared and not presented)

Thank you, Andrea, for that very nice introduction. I am delighted to be here today with so many distinguished guests at the Nuclear Regulatory Commission's 2023 Regulatory Information Conference, otherwise known as "the RIC." In this conference, NRC has once again gathered nuclear professionals involved in the safe and secure use of nuclear energy and other uses of radioactive material. While this is my first RIC, I appreciate that for 35 years now the NRC has hosted this meeting – a diverse gathering of professionals from the NRC, other government agencies, non-governmental organizations, academia, and industry – to discuss topics of mutual interest. I'd also like to extend a special welcome and thank you to our international partners participating in the conference, both in person and virtually. It is my distinct privilege to address all of you.

I'm told the RIC has a history of good humor. This was rightly paused during the height of the COVID-19 pandemic. Humor can also be difficult in a virtual setting. So, in our collective transition back to more normal interactions, I would offer you this: If you disagree with some or all of my remarks today, or if I make any factual errors, it's not my fault. I used ChatGPT to write this speech.

As many of you know, I am the last NRC Commissioner to offer a plenary speech at the RIC because I'm the newest member of the Commission. As Andrea mentioned, I began my tenure on the Commission in late August of last year. I was honored to navigate the Senate confirmation process in tandem with my colleague Commissioner Caputo, who has returned to service on the Commission. And I'd like to express my deep appreciation to all of my fellow Commissioners for their guidance and insights as I've settled into my role on the Commission over the past 6 months. I will also take a moment to thank and introduce you to my A-team: Candice Trummell, my Chief of Staff, Maxine Keefe, my Legal Counsel, Dave Brown, my Technical Assistant for Materials, and Janet Lepre, my Executive Assistant. And my Reactor TA, Brian Anderson, who recently left the NRC. I cannot overstate my gratitude for your professionalism and expertise, and perhaps more importantly, your tireless enthusiasm and support.

The title of this year's RIC – Navigating the Nuclear Future – is an appropriate theme for this point in history. However, if I could rephrase that title slightly, I would change it to – Navigating OUR Nuclear Future. I say "OUR" Nuclear Future because I believe the path forward for civilian nuclear energy is one that must be shared if WE are to succeed. And if you are participating in this conference, then you are on the front line of sharing this collective

responsibility to chart a path forward to a true and enduring nuclear renaissance. We can either share in the success of navigating our way to a responsible nuclear future, or we will share in the failure to do so. Like many of you, I prefer success.

So, what is success?

I'm sure each of us has a different definition of success depending on your professional and personal perspective. My version of success, which I will share with you today, reflects my view as just one Commissioner among the five-member Commission of the NRC. And my views are shaped by my understanding of the NRC's purpose, mission, and goals.

My views are also shaped by my personal and professional experiences prior to joining the Commission. And since I'm the new guy around here, I will briefly share with you a little more about me so you can better understand my perspective. I was born and raised in Carson City, NV. My father, Robert Crowell, served in Vietnam as part of a 23-year career in the U.S. Navy. He later served as Mayor of Carson City for 12 years until he passed in 2020. He devoted his life to public service, and he is the inspiration for my commitment to public service.

My career in public service began after graduating from Santa Clara University in California, when I drove to Washington, D.C., in a 1985 Cadillac I bought from a pawnshop in my hometown for $1900. After barely making it across the county, I cut my teeth answering the phone and writing constituent letters for former Nevada Governor and U.S. Senator Richard Bryan.

I later worked for Senator Sheldon Whitehouse of Rhode Island during his first term in the Senate. And from there I moved to a role in the Obama-Biden Administration at the Department of Energy, including as Assistant Secretary for Congressional and Intergovernmental Affairs. At DOE, I gained insights on many nuclear-related topics, including advanced nuclear reactor technologies, consent-based siting for spent nuclear fuel disposal, nuclear weapons modernization, and cleaning up America's Cold War-era environmental legacy. My tenure at DOE coincided with both the 2011 Fukushima nuclear accident in Japan and the 2014 radioactive waste incident at DOE's Waste Isolation Pilot Plant in New Mexico. In late 2016, I left DOE, and DC all together, to return to my home state of Nevada to serve as a cabinet member for two Nevada governors – one Republican and one Democrat – where I led the Nevada Department of Conservation and Natural Resources. In that role, I led a state-level cabinet agency of 1,000 employees responsible for a broad range of issues including hard-rock and critical minerals mining, hazardous and low-level radiological waste disposal, water rights, and land management, among other issues. Having served in leadership roles at both the federal and state levels of government, I have a unique understanding and appreciation for how public agencies can impact our daily lives.

These past experiences inform my thinking on "success" – for example, these experiences taught me that success in the operation of a public agency necessitates balance, transparency, efficiency, and fact-based decision-making. These are values I know the NRC shares as well. But these values deserve constant polishing and re-evaluation to ensure they are being implemented effectively. Organizational values of every kind lose their meaning if your stakeholders and the public, for whom we ultimately serve, do not experience the benefit of these values when put in practice.

Today, I will share my views on what I believe constitutes success over the next five years – what our shared nuclear future can, and should, accomplish in that time. I've chosen five years because I see that period as a critical window of time that will determine whether nuclear energy can establish itself as a lasting, meaningful part of our country's energy portfolio. Conveniently, five years also corresponds to the length of my current term at the NRC. So as of today, 1,568 days remain for me to do my part in successfully navigating our nuclear future.

Game on.

So, how do I define success in the context of navigating our nuclear future?

In short, I believe successfully navigating our nuclear future will be measured by the progress that we make in three fundamental areas: (1) health and safety, (2) climate change, and (3) energy security. I'll address each in turn.

First, the NRC must remain vigilant in its commitment to adequately protecting the public health, safety, and security of the American public and the protection of our environment. These concepts are at the core of NRC's mission and must never be compromised. This commitment requires the NRC to maintain a strong safety culture, and ensure continued focus on learning, innovation, diversity and inclusion, and the adoption of technology. And the NRC must continue to build trust as a capable, independent, transparent, and objective regulator. But this trust must be earned. It necessitates consistent, proactive engagement.

Second, to achieve success, I believe the NRC must execute its mission on a timeline that supports the U.S. Government's energy and climate goals. Today, nuclear energy provides approximately 20 percent of our electricity generation in the United States and 50 percent of our carbon-free electricity. Nuclear will likely play a prominent role in meeting our country's collective carbon reduction goals. This means our regulatory decisions must be technically sound to maintain adequate protection of public health and safety and protection of the environment. But equally as important, these decisions must also be made on a timeline commensurate with the urgent realities of climate change.

At risk of putting too fine a point on it, we are facing the urgent imperative of climate change and the need to realize significant reductions in carbon by end of this decade. The science shows clearly that in order to avert the worst impacts of climate change and preserve a livable planet, we must take global action to limit the increase in average global temperature to 1.5°C above pre-industrial levels. Currently, temperatures already about 1.1°C warmer than it was in the late 1800s, and emissions continue to rise. To have any chance at keeping global warming to no more than 1.5°C – as called for in the Paris Agreement – emissions need to be reduced by 45% by 2030 and reach net zero by 2050[1]. The United States has a moral obligation to doing its part to meet this goal as a responsible steward of our shared natural environment, but also to maintain our global leadership role and capture the economic benefits of the clean energy economy.

[1] https://www.un.org/en/climatechange/net-zero-coalition#:~:text=Currently%2C%20the%20Earth%20is%20already,reach%20net%20zero%20by%20205

As President Biden's climate envoy, former Senator and Secretary of State John Kerry said recently in reference to nuclear energy and addressing climate change: "I don't think we can get there without it."

There is a need for secure, reliable energy for our low or zero carbon energy future.

Nuclear energy is a critical option for on-demand, baseload power to compliment the expansion of renewable energy and energy storage that must replace our current reliance on fossil fuels.

A perfect case in point of this imperative is demonstrated by recent events like California reversing course to maintain the carbon-free power from the Diablo Canyon Nuclear Power Plant. In fact, we are seeing more states across the political spectrum increasingly consider new nuclear power and/or overturning existing state-level bans on nuclear energy. Whether states are moving in this direction to meet state-level clean energy goals, for enhanced energy security, or both, what is becoming abundantly clear is that nuclear energy will be needed to achieve either objective.

While the NRC is not in the driver's seat on climate change and energy security, we must also not be a hindrance to success in these areas.

Finally, the third fundamental area by which we should measure success is energy security. The realities of climate change and the necessities of energy security go hand-in-hand. Working with our international partners to allow for safe expansion of the use of nuclear energy across the globe is part of forming the foundation of a reliable, safe, secure, and de-carbonized domestic energy sector here at home. As regulators from across the world, we are all responsible for making technically sound decisions that are in the best interest of our respective sovereign nations. But we will also all benefit from continued collaboration, particularly as we review novel technologies and operational approaches. As Canada's Rumina Velshi said recently, this "process will be smoother and easier if we are willing to share our experiences as we go through it – and learn from others along the way."[2] This point is underscored by the newly emergent geopolitical realities of energy supply and energy services following Russia's invasion of Ukraine. For nuclear energy, this reality has shown a spotlight on the long overdue need for the U.S. to establish an adequate, reliable, domestic supply of nuclear fuel and related enrichment services.

These geopolitical challenges are obviously much larger than just the nuclear fuel conundrum in the U.S., and I thank our special guests and speakers here this week – Ambassador Holgate and Director General Grossi – for their steadfast attention to the full spectrum of energy and other security challenges triggered by Russia's actions in Ukraine. I join my fellow Commissioners in applauding our Ukrainian counterparts for their steadfast vigilance in the face of unimaginable adversity.

[2] https://www.canada.ca/en/nuclear-safety-commission/news/2023/02/remarks-by-rumina-velshi-at-the-2023-conference-on-effective-nuclear-and-radiation-regulatory-systems.html

Now, how do we achieve success?

Thus far, I've outlined goals for a successful, responsible, and lasting nuclear renaissance. But how do we get there?

I believe the recipe and ingredients for success exist today more than at any one time since the advent of commercial nuclear power over 70 years ago. While much has been slowly percolating in the commercial nuclear energy sector over the past 10-15 years, the momentum we are seeing today began accelerating in just the past few years.

In the United States, the Nuclear Energy Innovation and Modernization Act of 2019 (or NEIMA) set the stage for modernizing the commercial nuclear energy regulatory process in preparation for a new era of advanced nuclear power technologies. While the NRC has been working to fully implement NEIMA's requirements, the White House and Congress came together again in 2021 to enact new and enhanced incentives to help maintain the viability of our existing nuclear fleet, while also supporting the development of new advanced reactor technologies that promise to deliver more carbon-free nuclear energy to our grid through safer and more cost-effective nuclear reactor designs and advanced fuels.

Two landmark bills, the Bipartisan Infrastructure Law and the Inflation Reduction Act, each included what Congress determined to be essential support to help secure the future of carbon-free nuclear energy in the United States. The nuclear related provisions of both bills received bipartisan support in the House and Senate – a fact that in and of itself shouldn't be notable, except that in today's political environment, it is a rarity – especially on a topic like energy policy. And Congress took additional action just last year to fill another critical gap necessary for navigating our nuclear future – by providing needed direction and investment to establish a secure, long-term domestic nuclear fuel supply chain.

So here we are in 2023, with the makings of a modernized regulatory pathway and significant federal financing incentives for new and existing nuclear power plants and nuclear fuel supplies coming together at the same time advanced nuclear technologies are on the cusp of commercialization. This confluence is noteworthy. And it should not be taken for granted. It is an all too often uncommon occurrence in the less than perfect world of policymaking.

Now while we have all of these elements converging as crucial ingredients in the recipe for success, the cake will not bake itself. Everyone attending the RIC this week has one or more roles to play in helping this recipe come together – to ensure nuclear energy can be a safe, secure, and reliable part of our clean energy future. And the Nuclear Regulatory Commission itself is no exception. Indeed, the NRC's role is not only critical, but perhaps the most daunting as well. The NRC will need to shift the way it has traditionally operated to accommodate an anticipated workload that is larger and broader in scope than ever before. And it must do so on a timeline and continued pace unlike at any point since the agency's inception.

But I am confident that with clear direction and sustained leadership from the Commission and NRC senior career staff we can keep the agency true to its mission while not losing sight of the bigger picture imperatives of climate change and energy security. I am confident the expert,

dedicated staff throughout the NRC is up to the task. In fact, I think they are hungry for the challenge. Or as my colleague, Commissioner Wright, would say, ready to "meet the moment."

As the newest Commissioner on the NRC, I am committed to helping facilitate the agency's success. To transform the NRC into a modern, risk-informed, and efficient regulator. In doing so, I intend to question the status quo through leveraging my prior leadership roles in federal and state government. I will endeavor to maintain my external perspective to ensure the NRC's transformation is achieved not through words, but through tangible and common-sense actions.

So how do we do this? It's not going to be easy. But I will share with you some of the ongoing and necessary reforms that I believe are most important for the NRC to do its part.

Reinvigorating the NRC staff

One of the NRC's current strategic goals is to continue fostering a healthy organization. To do that, we must re-invigorate the NRC with a renewed and expanded sense of purpose. In 1962, President John F. Kennedy visited NASA for the first time. During his tour of the facility, he met a janitor who was carrying a broom down the hallway. When the President asked the janitor what he did for NASA, the janitor replied, "I'm helping put a man on the moon." At the NRC, all employees should understand how important their respective roles are to ensuring the safety and security of nuclear technology, and that the agency's mission is integral to meeting our collective climate and energy security goals.

We must always maintain a strong safety culture. This requires that all employees feel free to raise concerns all the way up to the Commission level if needed, and that they know their concerns are heard and addressed. Good ideas and questions can come from any person at any level in the organization. We must be vigilant in breaking down siloes throughout the agency that impede effectively working together. And we must avoid the temptation of thinking myopically, speaking in bureaucratic terms rather than in human ones, and never losing sight of the big picture or forget our shared sense of purpose as a public servants.

The NRC must be innovative, become more diverse and inclusive, and be a learning organization that values continuous improvement. The NRC has a tremendous track record of ensuring safety and security. Moving ahead, we must maintain that rigor at a scale and on a timeline unlike ever before. But in doing so, we must also not be afraid to try and to fail occasionally along the way. To build on Chair Hanson's quoting of Albert Einstein in his remarks yesterday, Einstein also said "failure is success in progress." We must remember that true and lasting transformation is an iterative process.

It all starts with having the right workforce. The current NRC workforce is world-class, but increasingly retirement eligible. More than 57% of the agency is over the age of 50.

Factoring in attrition rates, we will need to hire between 100 and 200 new employees every year just to maintain current staffing levels. If a lasting nuclear renaissance takes hold beyond the next five years, then we will need to continue to grow further to meet the increasing workload.

We need to attract, develop, and maintain a high-performing, diverse, engaged, and flexible workforce. And we must do so in an environment where we are competing with each of your organizations for a very specialized and limited talent pool.

We are not only thinking about the workforce we need in the future, but also the regulatory processes that the workforce is currently developing and will navigate in the future. The amount of hugely important work to be done at the NRC cannot be overstated. For example, Congress directed the NRC to develop a risk-informed, technology-inclusive regulatory framework for advanced reactors. The Part 53 rulemaking is just one of many enormous regulatory efforts underway at the NRC.

Nothing is possible without public trust

Another current strategic goal is inspiring the public's confidence in the NRC. To do this well means we must double-down on our current efforts to engage in proactive and meaningful interactions with States, Tribes, and other governmental and non-governmental organizations – as well as with industry, international bodies, and the public. The NRC must provide fair and timely opportunities for public involvement in its decision-making. I recognize the challenges around public communication in a large government organization, but clear, understandable communication must always be a one of the agencies highest priorities.

From the big picture context, I doubt the majority of the public in the United States has heard of the NRC, and even less know what the NRC does. And of those that are familiar with the NRC, it's very possible that their impression of us is not a positive one. This is needs to change. But it will not change if we remain in the shadows. And it will not change without every NRC employee doing their part to improve the narrative in the course of the role at the agency. We must all be working from the same common theme and sense of purpose. We must develop new communication strategies, get better at explaining what we do – in the plainest language possible – such that our friends and neighbors can understand and appreciate the important role the NRC plays in our daily lives. We must always strive to provide high-quality information to the public in an accessible, comprehensive, and clear manner. And we must ensure any person or organization who wishes to participate, can understand and navigate our regulatory processes.

We must focus on the full fuel cycle – from mining to waste

To build trust, we must re-assert commensurate focus on the full fuel cycle. Over the years, there have been several studies and polls that have shown the support for nuclear energy would increase if the waste disposal issue were resolved. While the NRC is not in charge of siting a permanent nuclear waste repository, that doesn't mean we should ignore the reality that one is needed, and that a consent-based process is the best route for doing so. We need to approach technical and regulatory decisions related to decommissioning with the same rigor as new reactors. The same goes for life extension requests for the existing fleet.

We know spent nuclear fuel and high-level waste is and can continue to be stored safely for the foreseeable future, and I agree with Bill Gates who has noted that nuclear waste is not a reason

to not deploy more nuclear energy[3]. However, I believe our regulatory decisions will have broader public acceptance if the public knows we are considering the entire fuel cycle, and if there is proactive engagement on used fuel management and waste disposal by the commercial and public entities involved.

As the nuclear power industry continues to transform from large light water reactors and a once-through fuel cycle to what may be a future of small and advanced reactors powered by recycled fuel – the NRC must recommit itself to keeping apace. The opportunities for diversification within the U.S. nuclear industry are nothing less than breathtaking! New fuels. New enrichment processes. New reactors. And, yes, possibly even new ways to manage waste by recycling and reusing spent fuel. And "fission" isn't the only game in town anymore, either.

Dare I say it? Fusion could make an appearance on just the other side of the five-year window I've focused on today.

I just mentioned managing waste among the things that will be part of a revitalized nuclear power industry. As we move forward, I think it will also be important to successfully manage decommissioning – of all kinds of facilities. Nuclear facility decommissioning and radioactive waste management – safely managing wastes throughout the entire fuel cycle – weighs heavily on peoples' minds. The legacy of contaminated sites includes abandoned uranium mines; uranium milling and mill tailings disposal sites; and low-level waste disposal facilities. Remedying and not repeating mistakes of the past will require proactive engagement with a broad array of stakeholders.

In five years, the NRC's reputation must be:

- The NRC makes sure civilian nuclear power is safe for everyone, now and for future generations.

- Because the NRC makes safe nuclear power possible, it plays an important part in averting climate change.

- The NRC is essential to our long-term energy security, by facilitating the safe adoption of reliable, advanced nuclear energy technologies.

This is a tall order, but it is now or never. Another false start in a hoped-for nuclear renaissance will spell doom for the future of advanced nuclear energy. Neither policymakers, nor the public will have the patience or belief that widespread nuclear energy is feasible. Five years from now, nuclear energy is either in the game as a safe, reliable part of our energy supply, or it will become a stagnant, declining part of our energy portfolio for the remaining life of the existing fleet.

The table is set for a true renaissance this time like never before: legislation, geopolitics, climate change, energy security, technological readiness. The NRC needs to be part of the solution by making data-driven and risk-informed decisions that enable the deployment of safe and secure nuclear technologies on a timeline commensurate with our shared climate and carbon reduction

[3] https://www.cnbc.com/2023/02/10/bill-gates-nuclear-waste-is-not-a-reason-avoid-nuclear-energy.html

goals. As Energy Secretary Granholm said, “These next few years offer a can’t-miss opportunity to harness nuclear’s full potential.” I couldn’t agree with her more.

Each of you play a role in making this opportunity a reality. Thank you all for allowing me to share my perspective. I welcome any questions you may have for me today.