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Thanks, Andrea. Good morning. It’s great to be with you all at another RIC. It would be nice, of course, to see you all in person. But this virtual conference is still a great opportunity to share what’s happening at the agency and hear from interested stakeholders.

An unfortunate casualty of a virtual plenary, however, is humor. At the 2019 RIC, to meet your unending demands for humor in RIC speeches, I turned to NUREG-0544, NRC’s legendary Collection of Abbreviations. I had planned to continue our journey through NRC’s universe of abbreviations in 2020. Alas, that RIC was cancelled due to the pandemic. Rather than getting back to the abbreviations in 2021, I have grudgingly opted to hold off until next year. Let’s face it, it’s just not the same if we can’t hear the groans and the chuckles. So that will be something for us to look forward to – with bated breath, I’m sure – in 2022.

For now, I want to focus on three pressing challenges affecting NRC, and really, the world. They are: the fight against climate change, the response to the Covid-19 pandemic, and the pursuit of environmental justice.

Policymakers and the public are increasingly focused on the climate crisis and on dramatically reducing carbon emissions. President Biden has made it a priority to put the United States on a path to eliminate carbon emissions in the electric sector by 2035 and achieve a net-zero economy by 2050. Many states and utilities have adopted similar targets.

The urgency and scale of the climate challenge have led to a public debate about the available emission-reduction technologies and the role of nuclear power. Obviously, NRC is not charged with setting broad energy policy. We don’t get involved in decisions about electricity market design, carbon pricing, or electricity generation portfolios. Our focus is on ensuring the safety and security of whatever amount of nuclear power is used. But I think it’s clear that meeting these ambitious climate goals will involve nuclear power. I see NRC’s nexus to climate change in two main areas: the operating fleet and new reactors.

For the long-term operation of existing nuclear power plants, NRC’s role is to provide strong safety and security standards and rigorous independent oversight. In recent years, there has been a counterproductive emphasis on reducing inspections, cutting costs, and creating ever more restrictive backfit constraints on agency action. We need a course correction. We need to re-focus on safety and the basic value of oversight. Instead of pursuing reductions in the frequency or number of

comprehensive engineering inspections, problem identification and resolution inspections, and force-on-force physical security inspections, we need to pursue changes that will improve NRC oversight, not weaken it.

The Reactor Oversight Process has never been static, and I don't think it should be. But the ROP has generally been an effective safety framework. When we consider changes, NRC needs to be very careful that we don't damage a program that has been working well or make changes that result in unintended consequences. This program affects every operating reactor in the country, and our number one priority must be the safety and security impact of our decisions.

So how should we evaluate potential changes to safety standards or inspections? It's important to continue to take advantage of risk insights in our regulatory decisionmaking. And if we're going to make a particular change, there should be a solid safety case for the change, based on operating experience, inspection experience, and the judgment of our inspectors and experts. We should not adjust safety standards or oversight based mainly on cost considerations without a strong safety case. Safety is NRC's core responsibility. Shifting resources from lower-risk items to higher-risk items can improve oversight. But that assumes that there is a shift in resources and not an overall cut.

It's also important to remember that oversight positively impacts performance. Improvements in plant or fleet performance don't occur in a vacuum. NRC standards and inspections contribute significantly to those improvements. That's one reason why a period of good performance doesn't justify weakening safety standards or cutting inspections. This might be easier to see if we step out of the nuclear context for a minute.

According to the National Highway Traffic Safety Administration, there has been a general downward trend in traffic fatalities over the past 40 years. But that isn't a reason to stop requiring seat belts, air bags, or infant car seats. The opposite is true. Those requirements are a big part of the reason for that positive safety trend.

And just because there wasn't a major e. coli or salmonella outbreak in a given year, doesn't mean USDA stops inspecting food. Those inspections are vital even if you've been having a good year.

Of course, there's room for innovation, for risk-informing, for real efficiencies in the ROP. We don't need to settle for the status quo. If we keep our focus on safety, we can make the right kind of changes. Instead of reducing the frequency of comprehensive engineering inspections, the annual engineering inspections should focus on different and often uninspected, safety-significant areas each year. This would give the NRC staff the flexibility to shift the engineering inspection focus to areas of emerging need as the nuclear power plant fleet ages and adopts new technologies. Rather than reducing the frequency of problem identification and resolution inspections, we should find ways to make this important inspection more effective at spotting corrective action program weaknesses and better able to promptly detect any adverse trends in a plant's safety culture.

We should also take a fresh look at the cross-cutting issues program. The purpose of the program is to determine whether a nuclear power plant has an issue with human performance, safety conscious work environment, or problem identification and resolution that affects all aspects of operating the plant. These focus areas are all vital to the safe operations of a nuclear power plant. But the threshold for identifying a cross-cutting theme at a plant is currently very high. For example, it could take 20 overall human performance findings at a plant during a one-year period to trigger any

action under the program. As a result, the thresholds have rarely been met, even at plants that later had major performance problems. The idea behind the cross-cutting issues program is good, but we need to make it more effective.

NRC needs to be open to – and ready for – new technologies that could improve safety. Whether it’s digital instrumentation and control, accident tolerant fuels, sensors, or advanced manufacturing techniques, we need to establish a reliable and predictable regulatory framework for reviewing these technologies, while ensuring that they are adopted safely without introducing any unacceptable risks. That’s also true for the increased use of artificial intelligence and data analytics. There are a number of potential applications of these technologies in the nuclear sector that could increase both safety and efficiency. I’ll be chairing a technical session Thursday morning at 10:30 on this topic and hope you will join us for an engaging and informative discussion.

NRC also needs to focus on the impacts of climate change on nuclear power plants. The recent blackout in Texas and other parts of the country highlights how the changing climate can create vulnerabilities in electric generation assets and the grid. Once in a century extreme weather events are now occurring with disturbing regularity. In the case of Texas, extreme cold challenged generation assets, and one of the four reactors in the state had to shut down for a period of time because the cold temperatures disrupted the feedwater system. But scientists tell us that extreme temperatures are not the only hazard exacerbated by climate change. Flooding, hurricanes, and snow and ice loads are expected to pose greater challenges to nuclear power plants and the grid in the future than they have in the past.

NRC has launched a key initiative to keep up with the latest science of natural hazards. The staff has established a more routine, proactive, and systematic program for identifying and evaluating new information related to natural hazards. The agency is now collecting, aggregating, and assessing new scientific information about a range of natural hazards on an ongoing basis. The staff is expanding its knowledge base for several types of natural hazards through active and ongoing technical engagement with other federal agencies, academia, industry, international counterparts, professional societies, and consensus standards organizations. When the staff obtains new information about a natural hazard, they assess its potential significance in the context of the accumulated hazard information, rather than in isolation. The ultimate goal is to determine if the new information could have a potentially significant effect on plant safety. This is important work. Our regulatory processes need to account for the changing frequency, intensity, and duration of extreme weather events caused by climate change.

In my view, preparing nuclear power plants for the impacts of climate change also will require the Commission to re-visit the post-Fukushima Mitigation of Beyond-Design-Basis Events regulation. The rule that was finalized in early 2019 did not require the FLEX equipment at nuclear power plants to be reasonably protected from the up-to-date flooding and earthquake hazards. Licensees and the NRC staff spent years using the latest science to determine the present-day flooding and earthquake hazards. Unfortunately, the current regulation allows a nuclear power plant’s FLEX strategy to disregard these reevaluated hazards and be prepared for only the old, outdated hazards. With a changing climate, flooding risks are not static. It makes no sense to allow licensees to rely on obsolete flood hazard estimates, most of which were calculated decades ago. That is the opposite of what we should be doing to prepare for the altered climate of the future.

I think there's broad agreement that the FLEX equipment is the single biggest post-Fukushima safety improvement at nuclear power plants. But the equipment doesn't do anyone any good if it doesn't work when called upon. And that means protecting the equipment from entirely predictable natural hazards. To adequately protect the public, NRC must ensure that the FLEX equipment has the resilience to survive the real earthquake and flooding hazards facing nuclear power plants. NRC also needs to make sure that plants are ready and able to use the equipment if they need to. That means adequate communications and staffing. It also means exercises and drills. The current regulation does not require any of these commonsense and non-controversial measures. As we take stock of the work we have all done to improve nuclear safety in the ten years since the Fukushima accident, it is time to address these gaps in our current regulations.

The other main climate-related role for NRC is the licensing and oversight of new reactors. Here, our main goal is to establish the right regulatory framework for the review and safe operation of new technologies, such as advanced reactors. NRC's current power reactor regulations were written for light-water reactors, which make up the entire existing fleet. It makes sense to update those requirements to address different technologies. Creating a regulatory framework for non-light-water reactors will enable the agency to perform effective and efficient licensing reviews and oversight, while providing regulatory certainty for potential applicants and vendors.

New reactor designs have the potential to be safer than existing designs. Here's the challenge: In our regulations, we need to strike a reasonable balance between taking into account the value of new safety attributes and maintaining a prudent degree of defense-in-depth. Some elements of NRC's existing regulations for large light-water reactors will not be appropriate for non-light-water reactors. Other requirements reflect enduring defense-in-depth principles that should apply to advanced reactors, such as the need for appropriate emergency planning and siting. To protect the public from low-probability, high-consequence events, these key defense-in-depth elements should continue to play an important role, even for designs that the NRC staff determines are safer than current designs. This is especially true for new technologies without operating experience.

Multiple, independent layers of protection against potential radiological exposure are necessary because we do not have perfect knowledge of new reactor technologies and their unique accident scenarios. Unlike light-water reactors, new advanced reactor designs do not have decades of operating experience; in many cases, the new designs have never been built or operated before. It's reasonable to expect that the agency and licensees will have much to learn about the issues, risks, and accident sequences particular to each new design. With the current fleet of light-water reactors, we learned over time that some accident scenarios were more important than initially predicted. Large break loss of coolant accidents were thought to be the most severe potential design basis accidents until a small break loss of coolant accident occurred at Three Mile Island. As operating experience continued to accumulate, it also became apparent that onsite and offsite electric power was less reliable than expected, and the station blackout scenario was found to be an important contributor to the overall risk of nuclear power plant accidents. A key lesson of this decades-long learning curve is that we should not drop independent layers of defense for novel technologies simply because we are convinced today that a new design will be safer than existing light-water reactor designs. We need to strike the right balance.

Responding to the Covid-19 pandemic is another major priority for the agency. This challenge is obviously not unique to NRC or our licensees. It is hard to overstate the impact the virus has had on nearly all aspects of our everyday lives and every sector of the economy. To continue our work, the

agency has been largely operating virtually, with almost all of the headquarters and regional staff teleworking. Fortunately, we've had the IT in place to carry on effectively. The staff has spent a considerable amount of time reviewing exemption requests from licensees and thinking through which requirements should temporarily not apply during the public health emergency.

The toughest balance for NRC to strike has been on inspections. We want to keep agency inspectors and licensee staff healthy, while conducting the vital oversight activities the American public expects from us. For the first few months of the pandemic, NRC was conducting very few in-person safety and security inspections. At most nuclear power plants, our resident inspectors were on-site far less than usual. And there were almost no regional team inspections happening. I appreciate that the staff has focused on getting the resident inspectors back on-site and on generally getting back to in-person safety inspections. The staff set a goal of meeting the minimum samples for the Reactor Oversight Process baseline inspections in 2020. With very few exceptions, that goal was met. For 2021, the staff is aiming to get back to normal inspection samples. I think that's the right target, and I know the NRC staff will do everything it can to meet this objective while protecting our inspectors and those with whom they interact.

Due to the unique health risks of conducting full force-on-force inspections at nuclear power plants during the pandemic, the agency relied on limited-scope physical security exercises for several months. As conditions have improved, we're re-starting force-on-force inspections. For now, we're conducting just one triennial exercise at each plant. I look forward to returning to the normal complement of two force-on-force exercises per plant as soon as practical.

Based on my conversations with NRC inspectors and managers, there seems to be a renewed recognition of the value of in-person safety and security inspections – whether it's the ability to walk down safety-related equipment, talk informally with plant employees, observe operations firsthand, or the intangible but very real effect of having inspectors with an NRC hard hat visible around the plant. Technologies that allow inspectors to monitor plant conditions remotely are a valuable tool but are not a substitute for in-person inspection.

NRC must also pursue environmental justice with determination and an openness to the voices of disadvantaged communities that have not always had a seat at the table. During the last ten months, the discussion of race in this country has changed dramatically. George Floyd's death after a white police officer knelt on his neck for nearly nine minutes launched protests and crucial discussions about racial inequality. The deaths of George Floyd, Breonna Taylor, and so many other black men, women, and children as a result of violence fueled by racial injustice have shined a spotlight on the pressing need for racial equity. We cannot hope to achieve racial equity without environmental justice. NRC must meet the moment. We must be ambitious. We cannot settle for doing things the way they have always been done. We need to ask tough questions about our programs and procedures to understand if they are serving disadvantaged communities -- or instead creating barriers for them to overcome.

The reality is that, in NRC's licensing decisions, environmental justice is basically only addressed in one section of an Environmental Impact Statement. That minimal treatment doesn't inspire confidence that environmental justice factors are having a meaningful impact on the agency's ultimate decisions. We need to ask ourselves whether and how that should change.

Our adjudicatory procedures have been called “strict by design.” Is that just another way of saying that the agency has made it very hard for interested stakeholders, including disadvantaged communities, to have their concerns addressed in a hearing? Has the agency created a set of rules that effectively erects barriers and excludes the voices of communities that lack the resources and the legal or technical expertise to surmount a series of complex procedural hurdles?

Or the process governing petitions seeking agency enforcement action ... is that system really set up to advance equity and make it straightforward for disadvantaged communities to raise concerns and trigger agency action?

If we are committed to viewing our historic practices through the lens of environmental justice, these are just some of the questions we should be asking about the way the agency has traditionally operated. Our first task should be to figure out what a systematic review of the agency’s programs and policies should look like. Our goal should be to achieve significant, tangible results in the areas of equity and environmental justice.

Climate change. Covid-19. Environmental justice. We have a lot of work ahead of us. But I am confident that NRC will do its part to tackle these challenges. We can’t do the work alone though. We need your ideas, creativity, and energy. Hopefully, we will soon be able to interact in person at meetings, site visits, and future RICs. In the meantime, I look forward to more opportunities to engage virtually. I also invite you to follow me on twitter. My username is [@JeffBaranNRC](https://twitter.com/JeffBaranNRC). And with that shameless plug, we have time for your questions. Thank you.