



# UNITED STATES NUCLEAR REGULATORY COMMISSION

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## U.S. Nuclear Regulatory Commission 36<sup>th</sup> Annual Regulatory Information Conference March 12, 2024 Commissioner Annie Caputo (as prepared and not as presented)

Down to business. NRC's goal is to become a "modern, risk-informed regulator." What does that mean and why does it matter?

To me, it means:

We are focused on our core licensing and oversight work.

Regulatory actions are consistent with the risk reduction achieved and promptly, fairly, and decisively administered, lending stability to the nuclear operations and planning.

We are agile and responsive to changes in the landscape, making decisions without undue delay.

We are transparent, independent, and externally aware, not isolated.

Why do we need to become a modern risk-informed regulator? Why does it matter?

At last year's RIC, I discussed how the primacy of our mission to protect public health and safety, to promote the common defense and security, and to protect the environment, is indisputable. In focusing on that mission and our day-to-day work that supports it, it is easy to lose sight of the larger, changing landscape and how we as an agency fit into a much bigger picture.

Energy is the lifeblood of the economy: not just ours, the global economy and every nation in it. The challenge of transitioning away from fossil fuels is driving growth in electricity demand at home and abroad. Policymakers in the Administration and Congress expect nuclear energy to play a significant role in meeting domestic and international energy needs.

We are the gatekeeper for nuclear energy. Whether nuclear energy will make a growing contribution to our nation's clean energy needs will depend on the posture with which we execute our safety and security mission. Given the NRC's global reputation for nuclear safety regulation and using risk information, the NRC should also be a leader in establishing best practices for reducing regulatory risk and improving the predictability and timeliness of licensing reviews. This is why the NRC must become a modern, risk informed regulator.

To put this in context, I'll take a few minutes to just scratch the surface of the challenge that is unfolding.

A couple months ago, the Commission held a joint meeting with the Federal Energy Regulatory Commission which we do occasionally.

One of the presentations was from the North American Electricity Reliability Corporation, known as NERC, on its 2023 Long-term Reliability Assessment. It was sobering to say the least.

NERC notes generator retirements are expected before sufficient replacement resources will be in service. Their Long-term Reliability Assessment indicates 117 gigawatts of new resource additions by 2033. But this is only slightly higher than the 83 gigawatts of retirements. Now -- more resources are in the early planning stages, but -- additional fossil-fired retirements are also likely. This leads NERC to conclude:

“Imbalance of generator retirements and resource additions challenges the ability to serve growing demand.” --North American Electric Reliability Corporation.

NERC also noted there has been a “sharp rise in demand and energy growth forecasts” since their 2022 report.

Sharp rise in demand and energy growth forecasts since 2022 LTRA” “Resource and transmission system planners must anticipate potential for accelerating growth.” --NERC

Growth in electricity demand is accelerating. But what does that mean in practical terms? For one utility, it means going from 2 percent annual growth in demand to 6 percent – annually—by 2028. That’s not a lot of time to finance, permit, construct, and bring new generation on line, much less if 6 percent demand growth becomes the new normal.

Where is this demand growth coming from?

One example NERC lists is that there are interconnection requests for 41 gigawatts, just for cryptocurrency. So, if the new resource additions NERC expects by 2033 only exceed the retirements by 34 gigawatts, the new resource additions will be fully consumed by the demand coming solely from cryptocurrency.

What about the electricity demand required to support additional data centers? One study from Boston Consulting Group estimates an additional 28 gigawatts by 2030. A different scenario with a higher use of Generative Artificial Intelligence could drive data centers to triple their current share of U.S. electricity consumption.

Then there is the effort to transition energy use away from fossil fuels and electrify the national economy. I gave an example last year of cities seeking to electrify urban centers and shift away from natural gas.

There are ongoing efforts to decarbonize transportation. While much attention has been focused on electric vehicles, there are also efforts in trucking, freight trains, and global shipping.

Whether these vehicles are electric or powered with a transportable fuel like hydrogen, these efforts are likely to drive growth in electricity demand.

Heavy industries are also exploring how to decarbonize. In Texas, Dow is partnering with X-Energy to transition its energy use to nuclear. The steel industry is also considering nuclear. Mining companies need energy sources for remote locations where micro reactors might fight the bill. Battery manufacturing is expected to drive growth in electricity demand in some parts of the country.

Oil and gas producers are shifting away from diesel power generation and connecting to the grid to reduce their emissions and fuel costs.

According to the Wall Street Journal, this is driving up electricity demand in New Mexico, Texas, and North Dakota. Some companies unable to connect to the grid are developing their own microgrids.

So, to summarize the national demand for electricity:

Generator retirements are expected before replacements are on line. And growth in electricity demand is accelerating.

These dynamics lead NERC to conclude that a “growing number of areas face capacity and energy risks in the next ten years.”

Yesterday, the Washington Post published an article entitled “Amid explosive demand, America is running out of power.” The article quoted a state public service commissioner saying, “When you look at the numbers, it is staggering. It makes you scratch your head and wonder how we ended up in this situation. How were the projections that far off? This has created a challenge like we have never seen before.”

This is a rapidly changing landscape – and this is all public information. You can begin to sense the scope and magnitude of the change that’s unfolding. It also becomes clear why there is a consensus and a sense of urgency in Congress and the Administration that nuclear energy must play a key role in meeting our nation’s need for clean energy and energy security.

In addition to the many efforts underway to spur nuclear energy development, the Administration signed an agreement at COP 28, the UN Conference on climate change, to triple nuclear energy capacity by 2050. COP 28 was in December and the US nuclear generating capacity was about 96 gigawatts at that time. That calculates out to 192 gigawatts of new nuclear capacity by 2050.

Since then, Vogtle 4 has started up. So, 1.2 gigawatts down with 190.8 gigawatts to go. That is ambitious to put it mildly.

Congress has also turned its attention to the NRC again, pursuing legislation in both chambers with strong bipartisan support.

Senators Capito, Whitehouse, and Carper have introduced the ADVANCE Act in the Senate to support the licensing of advanced nuclear technologies, to strengthen the domestic nuclear energy fuel cycle and supply chain, and to improve the regulation of nuclear energy.

Most recently, the House of Representatives passed their nuclear bill with a vote of 365-36, a remarkable bipartisan agreement especially given how contentious Congress is these days.

Here is the stated purpose of the House bill:

“H.R. 6544, the Atomic Energy Advancement Act, would advance the benefits of nuclear energy by establishing requirements for the Nuclear Regulatory Commission to license and regulate nuclear energy technology in an efficient, predictable, and timely manner.”

365 House Members feel such a sense of urgency with regard to nuclear energy that they agreed on the need to establish requirements for the NRC to be efficient, predictable, and timely. The legislation specifically directs the NRC to update its mission statement to include that:

“...licensing and regulation of nuclear energy activities be conducted in a manner that is efficient and does not unnecessarily limit:

- (A) The potential of nuclear energy to improve the general welfare; and
- (B) The benefits of nuclear energy technology to society.

This indicates a conclusion that the NRC must become more efficient, predictable, and timely. At least in Congress’ eyes, the NRC has not yet become a modern, risk-informed regulator.

The theme for this conference is “Adapting to a Changing Landscape.” Recognizing the landscape is changing is a necessary step but isn’t enough. Talking about it isn’t enough. In his book “Measure What Matters”, John Doerr stresses how “Ideas are Easy. Execution is everything.”

Results matter. Congress’ pursuit of legislation clearly reflects an expectation of improved performance on the part of NRC in recognition of the coming need for nuclear energy.

So, what’s to be done?

For NRC, the path to improving execution lies in getting back to basics, improving the agency’s agility, and achieving results.

Let’s start with the basics. In 1974, Congress passed the Energy Reorganization Act when the country was facing a different energy transition. The declared purpose sounds similar to many of the goals our government and industries are pursuing today:

The Congress hereby declares that the general welfare and the common defense and security require effective action to develop, and increase the efficiency and reliability of use of, all energy sources to meet the needs of present and future generations, to increase the productivity of the national economy and strengthen its position in regard to international trade, to make the Nation

self-sufficient in energy, to advance the goals of restoring, protecting, and enhancing environmental quality, and to assure public health and safety.

It was in this Act that Congress established the Nuclear Regulatory Commission as the safety and security regulator for the civilian uses of nuclear technology:

Energy Reorganization Act of 1974, Sec. 201. (f) There are hereby transferred to the Commission all the licensing and related regulatory functions of the Atomic Energy Commission...

Thus, licensing was the only specifically enumerated function, effectively designating it as our principal function. Today, while the agency remains diligent in its oversight and inspection work, licensing reviews are a relatively small portion of the agency's activities. Over time, the "related regulatory functions" have come to dominate our operations.

The costs of licensing reviews, and inspections to ensure compliance, are recovered from the respective applicants or licensees. Since 2016, this work has fallen over 40 percent. In 2023, licensing and oversight comprised only 21% of our \$927 million dollar budget and accounted for around 420 out of our nearly 2,860 budgeted employees. And yet, there have been delays in some licensing reviews, specifically license renewals, due to a lack of staff resources.

That means licensing is competing for management attention with the other "related regulatory functions" funded by the other 79% of our budget.

Another example is the NRC Strategic Plan. It contains 32 strategies. Only one is directly related to licensing decisions.

Promote risk-informed decision making to result in effective and efficient oversight, rulemaking, and licensing and certification activities.

These facts paint a picture of how licensing is not viewed as our priority. We need to get back to basics. Agency leadership should focus and prioritize efficient licensing reviews and effective oversight to make the safe use of nuclear energy possible.

Improving our execution also requires improving the agency's agility.

A common definition of organizational agility is the ability of an organization to adapt quickly to market changes and evolving customer demands. It involves flexible processes, rapid decision-making and a culture that embraces change and innovation.

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License renewal reviews was a change in the landscape. The fact that staff resources are still lacking after more than two years and in spite of hiring 600 new employees shows a lack of agility. There is a need to improve strategic hiring, knowledge management, versatility, and management to ensure we have the right skills at the right time to efficiently execute our workload.

NRC employees are skilled and dedicated and we need to invest in them. Whether they are new or have been with us for years, they are drawn by a commitment to public service and our mission. But it's not clear that we are giving them the training they need to develop or empowering them to fully contribute and be successful, whether they are environmental reviewers, project managers or resident inspectors. Our knowledge management should be structured to serve them well and expand their skills through cross-training to be valuable in a range of positions. Leaders need to be intentional and strategic so that when the landscape changes, the agency can quickly adapt by assigning staff with the right skills where they are needed.

In addition to a back-to-basics focus and improving organizational agility, there is a clear need to improve results. The first Kairos review was an important success, but it is one data point that needs to grow into a predictable pattern. Regulatory actions should routinely be risk-informed, objective, and transparent. Decisions should routinely be efficient, predictable, fair, and timely, lending stability to nuclear operations and planning.

The agency has taken steps to become more risk-informed by establishing a number of processes: Be Risk Smart, Risk Informed Process for Evaluations, Very Low Safety Significance Resolution Process, the Backfit Rule, and others.

However, it's not clear that these processes are being used to their fullest potential. There is also room to expand our efforts. The bipartisan legislation passed by the House of Representatives included language instructing the NRC to report on risk-informing our oversight and inspections after seeking input from the Secretary of Energy, national labs, the nuclear industry, and NGO's. However, we need not wait for Congressional direction.

This is an issue where we can take the initiative. We have over 20 years of experience with the Reactor Oversight Process. This provides a wealth of data and an opportunity to use data-driven decision making to risk-inform, refine, and modernize our oversight processes.

Recently, the Commission took an important step towards Part 53, the risk-informed, performance-based regulatory framework for advanced reactors. However, much work remains. One area that deserves close attention is the area of managing cumulative risk. Management of cumulative risk has historically been accomplished by our power reactor licensees using technical specifications.

Enshrining a comprehensive risk metric in rule text is a step not previously taken in the history of the agency and one that I fear will be fraught with complications in implementation. Regulatory Issue Summary 2007-21 and the discussion of the "Jordan Memo" would be a useful case study. For 30 years, the agency struggled with how to define and enforce maximum thermal power due to the nature of how normal fluctuations in plant parameters could produce slight increases in thermal power. Licensing a comprehensive risk metric could easily result in similar pitfalls. Workshops and tabletop discussions will be crucial to exploring the practicality of such a requirement.

Subsequent License Renewal reviews are an opportunity to embody the principle that "Regulatory activities should be consistent with the degree of risk reduction they achieve." Given the agency's extensive license renewal experience, subsequent license renewal reviews should exhibit improved efficiency and expend fewer resources than was necessary for initial license

renewals. The experience gained should produce a learning curve for later reviews to be more efficient based on lessons learned in previous ones.

Furthermore, the majority of the aging management programs that are in place with regulatory approval and oversight for the first period of extended operations should largely remain valid for continued operation. Applicants should be credited for these and other existing regulatory programs, like maintenance requirements, so that the scope of the review should focus on new issues or those unique to the 60– 80-year timeframe.

Another key to achieving improved results is the use of metrics as Commissioner Wright and I have proposed to our colleagues. Meaningful, objective performance metrics for licensing activities would allow the agency to benchmark best practices, discover opportunities for process improvements, and refine budget estimates. This is especially relevant as the agency conducts first-of-a-kind reactor licensing reviews that will likely bear higher costs than later reviews. Improved performance management will help verify whether there is learning curve leading to more efficient, consistent, and predictable reviews.

Shouldn't we want to have real metrics? Shouldn't we want to improve our efficiency, predictability, and timeliness? Shouldn't we want to know where we can improve? Shouldn't we want to know whether we are making progress?

We, as an agency, need to set clear and aggressive, but achievable goals. We need to track performance with meaningful metrics to achieve improved results. Metrics are essential to inform leadership and guide management on how best to demonstrate the agency's agility and improve the agency's execution.

Demonstrating efficient, predictable, and timely reviews aligns with Congressional expectations and important to maintain stakeholder confidence in the agency's effectiveness.

I also believe that demonstrating we can achieve timely reviews and celebrating those successes is vital to improving staff morale. In 2008 and 2009 when the agency was rated "the best place to work" in the federal government, it was the start of the nuclear renaissance when the agency faced a high workload and high expectations. The agency continues to have bright and capable staff today. I'm confident they will strive to meet the goals set for them. Achieving and celebrating such success is an essential element to job satisfaction, staff engagement, and pride in the agency.

## **Conclusion**

Mahatma Gandhi said, "It's not just words. Action expresses priorities." Becoming a modern, risk-informed regulator should not be an aspirational sound bite. It's a necessity to successfully execute our safety and security mission. I believe the agency should reassert the importance of licensing as principal to our mission, improve our agility in responding to fact-of-life changes, use data to track efficiency and guide performance improvements, and hold ourselves accountable for results.

Our country's growing need for electricity is going to require significant new generation. For nuclear energy to play a significant role, the NRC must become more efficient, predictable, and

timely in its licensing decisions. The Administration and Congress expects it, and our country needs it. Our actions express our priorities.

## Women

Now I'm going to take a few minutes to speak as a woman in the nuclear field.

IAEA just celebrated International Women's Day. Here in the U.S., it's Women's History Month. I'm glad to see Chair Hanson engaging on women's issues with several of our international colleagues.

Director General Magwood is continuing the Nuclear Energy Agency's efforts on Gender Balance and the mentoring program encouraging young women to pursue careers in nuclear. DG Magwood has long been a champion for women and I am immensely grateful for his advice during my own career.

Unlike DG Magwood, I've been a late comer to the discussion of women in the workplace. My eyes were opened over a year ago to the ongoing challenges women face. I'm going to recap the revelation and start of my journey with a couple events.

Shortly after I was confirmed for my second term, and I found myself getting "nukesplained". Someone with significantly less technical and policy experience talked to me as if I was clueless about an issue I had monitored for years. It was frustrating and demeaning...but I let it go and redirected the conversation to a different topic. I didn't want to be difficult.

Later that night as I reflected on the experience, I was frustrated. Then came the revelation: if this is still happening to me at this stage in my career, how many other women must also be struggling?

Not long after this experience, I ran into Rumina Velshi, who, as many of you know, is an amazing leader and so inspirational on this issue. I couldn't wait to share my story. She listened and then asked, "So what did you do about it?"

That was a wake-up call. What had I done about it? Nothing. The same approach I'd taken for my entire career. I didn't want to be difficult. I just ignored it and plowed forward.

The other event was watching a woman struggle repeatedly to speak up and contribute in a meeting at which point I also tried to speak up and struggled. It really hit home for me how women in those situations are faced with a dilemma. Do they assert themselves, make that contribution to the discussion, and risk being labeled difficult? Or, even worse, aggressive? Or do they play it safe, sit quietly, and let it go?

For how long...have how many women...tried so hard not to be difficult?

Well, here is what Jane Goodall has to say about that: "It actually doesn't take much to be a difficult woman. That's why there are so many of us." There is strength in numbers, ladies. There are a lot of us and we need to support each other.



We need to find ways to encourage each other as we advance our careers, mentor each other with strategies on how to be effective in the workplace, and be allies that speak up for each other when we see others struggle. Otherwise, the challenges we face today will remain for our daughters to confront during their careers.

Consider this example: A woman recently relayed a situation where she was told “You’re just lucky we let you have a seat at the table.”

Because I have started to speak out on these issues, women are reaching out to share experiences. My first thought was the same as it is to so many experiences shared with me: Seriously? In this day and age?

One thing is for sure, that’s not the voice of leadership, that’s intimidation. It says “Know, your place. Be seen and not heard.” For all those around the table who observe and stay silent, it becomes an endorsement that acquiesces and perpetuates that culture.

While I’m speaking as a woman and relaying a woman’s experience, I expect other minorities and gender-nonconforming people have likely experienced similar dynamics. I think one part of the solution is the same for all.

The challenge for leadership across the nuclear field is to truly create a healthy, collaborative environment that welcomes all contributions. How do we create a work environment that encourages everyone to reach their full potential? How do we support them, develop their skills, and give them the tools to be competitive so they become an obvious choice to have a seat at the table? That their contributions are valued and sought after?

My advice for anyone, is to start by having a career goal. If you don’t know where you are going, you may end up somewhere else. Yes, in addition to your roles as spouse, parent, employee, chef, chauffeur, dog walker, class parent, soccer coach, and everything else...find time to make a plan. You are your best asset and having a plan is an investment in your future.

Beyond that, seize opportunities to sharpen your skills. Build your network of people who empower and support you. Find mentors, accept their help, and learn all you can from them. And be brave.

The Nobel Peace Prize winner Wangari Maathai said: “Finally I was able to see that if I had a contribution I wanted to make, I must do it, despite what others said. That I was OK the way I was. That it was all right to be strong.”

Few of us are as brave and strong as Wangari. But I encourage you to be as brave and strong as you can.