S. HRG. 116–213

OVERSIGHT OF THE NUCLEAR REGULATORY COMMISSION

HEARING

BEFORE THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

UNITED STATES SENATE

ONE HUNDRED SIXTEENTH CONGRESS

SECOND SESSION

MARCH 4, 2020

Printed for the use of the Committee on Environment and Public Works

Available via the World Wide Web: http://www.govinfo.gov

U.S. GOVERNMENT PUBLISHING OFFICE
40–627 PDF WASHINGTON : 2020

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

ONE HUNDRED SIXTEENTH CONGRESS
SECOND SESSION

JOHN BARRASSO, Wyoming, *Chairman*

JAMES M. INHOFE, Oklahoma
SHELLEY MOORE CAPITO, West Virginia
KEVIN CRAMER, North Dakota
MIKE BRAUN, Indiana
MIKE ROUNDS, South Dakota
DAN SULLIVAN, Alaska
JOHN BOOZMAN, Arkansas
ROGER WICKER, Mississippi
RICHARD SHELBY, Alabama
JONI ERNST, Iowa

THOMAS R. CARPER, Delaware,
Ranking Member
BENJAMIN L. CARDIN, Maryland
BERNARD SANDERS, Vermont
SHELDON WHITEHOUSE, Rhode Island
JEFF MERKLEY, Oregon
KIRSTEN GILLIBRAND, New York
CORY A. BOOKER, New Jersey
EDWARD J. MARKEY, Massachusetts
TAMMY DUCKWORTH, Illinois
CHRIS VAN HOLLEN, Maryland

RICHARD M. RUSSELL, *Majority Staff Director*
MARY FRANCES REPKO, *Minority Staff Director*

C O N T E N T S

OVERSIGHT OF THE NUCLEAR REGULATORY COMMISSION

TUESDAY, MARCH 4, 2020

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
Washington, DC.

U.S. Senate Committee on Environment and Public Works Washington, DC.

The committee, met, pursuant to notice, at 10:07 a.m. in room 406, Dirksen Senate Office Building, Hon. John Barrasso (chairman of the committee) presiding.

Present: Senators Barrasso, Carper, Braun, Rounds, Sullivan, Cardin, Whitehouse, Gillibrand, Duckworth.

OPENING STATEMENT OF HON. JOHN BARRASSO, U.S. SENATOR FROM THE STATE OF WYOMING

Senator BARRASSO. Good morning. I call this hearing to order.

This morning, we will review the Nuclear Regulatory Commission's Fiscal Year 2021 budget request.

Clean and constant nuclear power is a cornerstone of our Nation's energy infrastructure. It is also vital if we are serious about addressing climate change. Nuclear energy reliability generates electricity to power our homes and our businesses.

Over the decades, utilities have steadily improved performance to increase how much nuclear energy the United States produces. As things stand today, this trend will not continue. Subsidized renewable energy production and costly regulations are contributing to the decline of America's nuclear industry.

To help preserve and expand nuclear energy, Congress passed the Nuclear Energy Innovation and Modernization Act. The law requires the commission to be prepared to review new reactor designs.

One nuclear startup company is poised to submit an application for a first-of-its-kind micro-reactor. This reactor will be radically different from today's nuclear power plants in size as well as in complexity. The commission's review will test its readiness to efficiently and affordably approve such new technologies. Preparing to license and oversee new technologies must complement the commission's ongoing oversight of today's reactors.

In 2018, the commission staff launched an initiative to modernize the program that oversees nuclear power plants. The staff proposed modest recommendations to improve the program. The recommendations prioritized and incentivized addressing the most important safety factors, and I support accepting and acting on those

recommendations. The agency should continue this initiative by identifying additional improvements.

We also need to preserve our Nation's nuclear fuel supply. America's nuclear reactors should be fueled by American uranium. The Department of Energy will soon release a report recommending actions to revitalize our nuclear fuel cycle, including uranium production. Wyoming is the only State currently producing American uranium.

Yesterday, the Secretary of Energy assured me America's uranium producers will be provided immediate relief. The Trump Administration understands the vital role uranium plays in energy and national security. Now we must act to preserve America's uranium industry.

We must also act to speed the deployment of the next generation of American reactors. China is now leading the world in nuclear deployment. Last year, China increased its nuclear generation by 18 percent. It plans to build replicas of American-designed nuclear reactors. We shouldn't let other countries dominate the global market with technologies that we have developed.

Russia is also advancing their nuclear interests. In December, they launched the first commercial floating nuclear plant to power remote populations near the Arctic Circle. Russia is also signing long-term deals with numerous countries, including Turkey and Egypt, to construct, operate, fuel, and service new nuclear power plants.

The President has taken steps to create an America-first nuclear energy policy. Congress and the Nuclear Regulatory Commission should also reassert America's nuclear energy leadership. The commission should partner with our allies and lead international nuclear forums to establish the regulatory framework for advanced reactor technologies. Congress should provide the commission the direction, the authority, and the resources that it needs.

The commission should not only be able to license new reactor designs, but also reduce barriers to manufacturing and to using new reactor designs. Many restrictions on our nuclear industry are over 60 years old. By modernizing these outdated laws, Congress can unleash America's nuclear potential.

I look forward to hearing more about how the Nuclear Regulatory Commission plans to meet the needs of the industry that it regulates.

I now turn to Senator Carper.

OPENING STATEMENT OF HON. THOMAS R. CARPER, U.S. SENATOR FROM THE STATE OF DELAWARE

Senator CARPER. Thanks, Mr. Chairman. Thanks for pulling this together and to the Commissioners, thank you. Thank you all for joining us. It is always, for us, a pleasure to meet with you and to see how we are doing and see how we can do even better.

Since last time we met, I just asked Laura Haynes Gillam, I said, how long has it been since the commission was before us, and she said, 10 months ago. Does that sound about right? About 10 months ago? And a lot has happened in 10 months. In fact, a lot has happened in the last 24 hours around the Country.

One of the things that has happened in the last 10 months is we have experienced, for the fifth year in a row, the hottest year on record. I think January was the hottest January on record. Our oldest son lives out in California. North of the Bay Area where he lives, he had wildfires bigger than the size of my State.

In Australia, about a month ago, they had wildfires that were bigger than the State I was born in, West Virginia. My wife likes to travel with some of her former colleagues. They are all retired from DuPont, and they just go places together. They went down to Antarctica in January. I asked her when she was down there, I said, is it cold? And she said, it is like in the 30's. I think maybe they got up to 40 1 day.

But since she has come home, since they have come home, we have seen temperatures down there as high as initially 63 degrees, record, 65 degrees, record, 68 degrees, record. While they were down there, a piece of Antarctica the size of the District of Columbia broke loose and floated off into the ocean.

There are some people, including somebody who is actually running for president, who thinks we ought to close all the nuclear plants in the Country. I think that overlooks the fact that, what is it, Mr. Chairman? About half the carbon-free electricity we generate, even in this Country we are in, the planet, comes from nuclear power plants. To say that we are going to close them all, or even a significant number of them is, I think, foolish if we are serious about addressing climate change and the climate crisis.

I am interested in hearing, we are interested in hearing, about new technology that is coming and how we can support that technology. So that is an audible, I have a statement here I am going to read, but that is little bit of an audible that I am going to start off with.

The United States has one of the safest, I think maybe the safest, nuclear industry in the world, and that is in no small part because of the Nuclear Regulatory Commission, which really continues to be the world's gold standard for nuclear regulatory agencies.

This morning, I hope we can discuss whether the President's budget proposal would provide NRC with all the resources and tools it needs to keep our Country's nuclear power the safest in the world. I also hope that we will be able to discuss the investments and advances that need to be made to ensure that nuclear power remains a safe and viable way to power our Country while promoting cleaner air and stronger public health.

As I have already stated, I think the power of safe nuclear energy, I believe in it, and I believe it is an effective tool in our arsenal to combat the growing threat of climate change. As global temperatures warm, ice caps melt, sea levels rise, our Nation's leading scientists have warned us repeatedly that if we fail to start seriously reducing carbon emissions now, by the end of the century, we will face catastrophic consequences.

We won't be around when that happens, but our children might be. Our grandchildren certainly will be, and we have to look out for them.

Meanwhile, across the Country, we have something like 96 operating nuclear reactors that are running more efficiently than ever

before. Think about that. Running more efficiently than ever before. These reactors are producing clean, carbon-free electricity.

As we face down the climate crisis, we would be remiss to dismiss the opportunity that comes with advanced nuclear power, a clean and carbon-free form of energy. By replacing old nuclear technology with new technology developed right here at home, technology that is safer, produces less spent fuel, and costs less to build and operate, we can reap the economic benefits of a new, advanced nuclear generation while doing right by our planet. I call it the intersection of doing something good for the planet and creating economic opportunity and growth and jobs.

In order to do that, however, we need to make sure that the NRC has the resources it needs to review these new technologies and keep our current nuclear reactor fleet safe. I hope we will discuss that today. If we want the U.S. nuclear industry to have a successful future, we need to invest in its future, and that means also investing in its work force.

Any organization needs a strong, dedicated work force to be successful. The NRC is no exception. As we talk about the next generation of nuclear technology, we need to be thinking about the next generation of nuclear scientists and nuclear engineers. We need to ensure that the NRC has adequate funding to continue to attract the best and brightest talent.

Unfortunately, the current Trump Administration has proposed, yet again, to eliminate the Integrated University Program. We think that is a mistake.

There is still hope for this carbon-free technology. We have to understand the decisions we make today will affect the industry for generations to come.

Let me just make a remark, Mr. Chairman, if I can, on safety, and people, have said oftentimes to me, that nuclear power is not safe. I spent 23 years of my life as a naval flight officer. My job, active reserve duty, a job, my squadron's job, were to track Soviet submarines in all the oceans of the world. Nuclear submarines, for the most part.

We would work with our own nuclear submarines, sometimes, on those missions. We have been in nuclear Navy ships, submarines, aircraft carriers for something like 70 years, 70 years. And when I talk to people who are questioning the safety of nuclear power, I tell them about that.

And I ask them this question: how many sailors have died because of exposure to the radiation on their submarines or their ships or aircraft carriers? How many have died in the last 60 or 70 years because of that exposure? And the answer is none. The answer is none.

So this is a technology that serves us well, especially in this day with rising temperatures and climate crisis. We need to strengthen it, not weaken it. We welcome you here today to help us figure out how to do that.

Thank you.

Senator BARRASSO. Well, thank you very much, Senator Carper.

We will now hear from our four witnesses, the Chairman of the Commission, Kristine Svinicki, Commissioner Jeff Baran, as well as Commissioner Annie Caputo and Commissioner David Wright.

We will continue with the committee's practice of a 5-minute opening statement by the chairman and 2-minute statements from each of the other commissioners.

I want to remind the witnesses that your entire written testimony will be made part of the official record.

Chairman SVINICKI.

STATEMENT OF HON. KRISTINE L. SVINICKI, CHAIRMAN, U.S. NUCLEAR REGULATORY COMMISSION

Ms. SVINICKI. Thank you very much. Good morning, Chairman Barrasso and Ranking Member Carper.

My colleagues and I appreciate the opportunity to testify this morning on the USNRC's licensing and regulatory actions since our last appearance, and on our Fiscal Year 2021 budget request. The funding we are requesting will enable the NRC to continue to uphold our important safety and security mission while improving the agency's efficiency and effectiveness, and will support NRC's continuing efforts to transform into a more modern, risk-informed regulator, including implementation of the requirements of the Nuclear Energy Innovation and Modernization Act.

These efforts are vital in light of the spectrum of applications for advanced reactors and other novel technologies the agency anticipates receiving in the coming years.

The NRC's Fiscal Year 2021 budget request, including resources for the NRC's Office of the Inspector General, is $863.4 million, including 2,868 full-time equivalent employees. This represents an increase of $7.8 million when compared with the Fiscal Year 2020 enacted budget.

When compared with the NRC's Fiscal Year 2020 total budget authority, however, which included the use of $40 million in prior-year carryover, this request represents a decrease of $32.2 million.

The Fiscal Year 2021 budget also reflects changes directed by NEIMA, the Nuclear Energy Innovation and Modernization Act, regarding fee recovery and limitations on corporate support costs to the maximum extent practicable. Our overall resources requested for the Nuclear Reactor Safety Program are over $450 million. This funding represents an increase when compared to the 2020 enacted budget. This is attributable, chiefly, to the development of regulatory infrastructure for advanced nuclear reactor technologies.

The Fiscal Year 2021 budget request for nuclear materials and waste safety is $125 million, and represents an increase of approximately $5 million. The budget request does not include funding for licensing activities related to the proposed Yucca Mountain Geologic Repository.

The Fiscal Year 2021 budget request for corporate support comprises 31 percent of the agency's total budget. This is not consistent with the 30 percent target in NEIMA, but the commission worked very hard to find efficiencies and did strive to meet the Act's requirement, but did provide a budget that does rely on the maximum extent practicable.

The agency has renewed its focus on risk-informed regulation, which has contributed to the agency's success over the past year in reviewing applications for new technologies or that raised novel technical issues. For example, in December, the commission ap-

proved the first early site permit for a small modular reactor at the Tennessee Valley Authority's Clinch River site, and the NRC staff is on target to complete its safety review of the new scale design certification for a small modular reactor design.

The agency also published a proposed rule regarding emergency preparedness for small modular reactors and other new technologies for public comment. Also in December, the technical staff of the NRC issued the first subsequent license renewal for an operating plant.

In summary, the NRC's budget request before you reflects the resources necessary to perform our vital safety and security mission while making needed investments in the agency's future success. The NRC will also continue to take steps to improve our regulatory processes and to position the agency to meet these future challenges.

Thank you very much on behalf of the commission for the opportunity to appear before you, and we are pleased to answer your questions at the appropriate time.

Thank you.

[The prepared statement of Ms. Svinicki follows:]

WRITTEN STATEMENT BY KRISTINE L. SVINICKI, CHAIRMAN UNITED STATES NUCLEAR REGULATORY COMMISSION

Good morning Chairman Barrasso, Ranking Member Carper, and distinguished members of the Committee. My colleagues and I appreciate the opportunity to testify this morning on the U.S. Nuclear Regulatory Commission's (NRC) Fiscal Year (FY) 2021 budget request.

The NRC is an independent Federal agency established to license and regulate commercial nuclear power plants; research, test, and training reactors; nuclear fuel cycle facilities; and radioactive materials used in medicine, in academia, and for industrial purposes. The agency also regulates the transport, storage, and disposal of radioactive materials and waste and the export and import of radioactive material.

The agency's statutory mission is to license and regulate the Nation's civilian use of radioactive materials, to provide reasonable assurance of adequate protection of public health and safety, and to promote the common defense and security. The funding we are requesting for Fiscal Year will enable the NRC to continue to uphold our important safety and security mission while improving the agency's efficiency and effectiveness.

The NRC's proposed Fiscal Year budget request, including resources for the NRC's Office of the Inspector General (OIG), is $863.4 million, including 2,868 full-time equivalents (FTE). This represents an increase of $7.8 million, including 102 fewer FTE, when compared with the Fiscal Year enacted budget. When compared to the NRC's Fiscal Year total budget authority, which included the use of $40 million in prior-year carryover, this request represents a decrease of $32.2 million or approximately 3.6 percent. The Fiscal Year budget request also reflects changes directed by Public Law 115–439, the "Nuclear Energy Innovation and Modernization Act" (NEIMA) regarding fee recovery and limitations on corporate support costs to the maximum extent practicable.

Before I discuss specifics of the NRC's Fiscal Year budget request, please allow me to provide an update on the NRC's ongoing regulatory activities and our continuing efforts to transform into a more modern, risk-informed regulator, including implementation of the requirements in NEIMA. These efforts are vital in light of the spectrum of applications for advanced reactors and other novel technologies the agency anticipates receiving in the coming years.

This renewed focus on risk-informed regulation has contributed to the agency's success over the past year in reviewing applications within established schedules for new technologies or that raise novel technical issues while maintaining the NRC's strong commitment to ensuring public health and safety. In December, the Commission approved the first Early Site Permit for a Small Modular Reactor (SMR) at the Tennessee Valley Authority's Clinch River Site. At that time, the Commission also published a proposed rule regarding "Emergency Preparedness for Small Modular Reactors and Other New Technologies" for public comment in the Federal Register. Additionally, the NRC staff is on target to complete its safety review of NuScale's Design Certification for a SMR Design and issued a Safety Evaluation Report with no open items in December of last year. Also, in December, the technical staff issued the first subsequent license renewal for an operating plant, for which the staff resolved a number of first-of-a-kind technical issues in the course of its safety review.

NRC'S RESPONSE TO A CHANGING REGULATORY ENVIRONMENT

Nuclear Energy Innovation and Modernization Act (NEIMA) The NRC has made significant progress over the past year implementing licensing strategies required by NEIMA.

In January, the NRC's Executive Director for Operations and Deputy Chief Financial Officer appeared before this Committee and provided an update on the agency's activities and progress on implementing various sections of NEIMA. Last month, the Commission responded to a December 19, 2019, letter from Committee members and provided an update on the agency's completion of various reports and activities required by NEIMA. To date, the agency has sent 9 reports to Congress on topics ranging from accident-tolerant fuel to lessons learned from emergency evacuations to guidance on baffle-former bolt examinations. The agency has developed a rulemaking plan for advanced reactor licensing and reviewed the feasibility of establishing a flat fee structure for licensing actions from uranium recovery facilities. Additionally, the NRC has begun work on NEIMA's requirement that the NRC develop a technology-neutral framework for licensing advanced reactors. The NRC also continues to implement the changes to the agency's budget process directed by NEIMA.

Transformation Recognizing that the agency needs to enhance its use of risk-informed, innovative approaches in response to external technology-driven changes and embrace new and diverse ideas, we are modernizing our decisionmaking processes to address novel issues raised by applicants and licensees. We are implementing innovative actions to transform the NRC's organizational culture to become a more effective and efficient safety regulator.

Communication and employee engagement are key to our transformation effort. Last June, we held our Futures Jam. A "Jam" is a multi-day collaborative online discussion. This concept has been successfully and effectively adopted in organizational settings—including at IBM, the European Union, and the North Atlantic Treaty Organization—as a collaborative crowd-sourcing of ideas. Over 70 percent of the NRC's work force participated in the Jam and submitted over 4,000 posts during the 3-day session. Incorporating this input, the NRC staff has identified seven initiatives that focus on culture, career enhancement, risk, process simplification, technology, and signposts and markers to incorporate external awareness in the NRC's planning processes.

This past October, the Commission held its third public meeting on NRC transformation activities where we heard from agency staff on the status of the initiatives supporting the focus on improving the effectiveness of its mission as a "modern, risk-informed regulator." Areas highlighted during this meeting included recruiting, developing, and retaining a strong work force; improving decision-making through accepting appropriate risk; using technology more efficiently; and establishing a culture of innovation. Also, in October, the agency held a Transformation Expo, where the staff presented interactive displays and showcased new approaches in support of transformation efforts that are under way across the agency. The Commission has scheduled additional transformation meetings to maintain awareness of ongoing staff activities and provide direction to the staff, as appropriate.

Strategic Workforce Planning Effective human capital management is critical to retaining and attracting talent so that the NRC has the necessary skill balance available as the future unfolds. Strategic Workforce Planning is an essential tool used by the NRC in identifying the knowledge, skills, and abilities necessary to perform our mission now and in the future. One key outcome of these efforts was the identification of a need to develop a pipeline of future talent to fill anticipated vacant positions due to the increased attrition expected over the next 5 years. In recent years, the agency's evolving workload and declining budget environment significantly limited entry-level hiring. This created challenges to our long-term human capital management strategy. The lack of entry-level hiring to achieve a demographically balanced work force could negatively affect the agency's continuing ability to accomplish its mission.

The NRC revitalized its Temporary Summer Student Program to increase the pipeline of entry-level individuals for critical skill positions. In 2019, we successfully transitioned 35 percent of our summer student hires into our Cooperative Education Program (Co-Op); we anticipate that nine of these Co-Op students will graduate by June 2020 and fill entry-level positions within the agency. In Fiscal Year 0, the NRC anticipates hiring approximately 25 entry-level engineers and scientists through a new entry-level training program. Strategic Workforce Planning has become part of the agency's normal operating procedure and will be addressed annually each September.

Moreover, in keeping with our goals to become a more effective and efficient regulator, the agency completed the merger of two of

its largest offices, the Office of Nuclear Reactor Regulation and the Office of New Reactors. This merger reflected changes in the agency's workload, specifically the decline of applications for new large light water reactors. The Fiscal Year budget reflects the efficiencies gained from this merger.

Enhancing the Reactor Oversight Process (ROP) The NRC developed the ROP as a risk-informed, performance-based oversight program. The staff has provided recommendations to the Commission that would enhance the ROP including the following: closing greater-than-Green inspection findings and performance indicators after followup inspection objectives are met; reducing baseline inspection redundancy to better enable inspectors to focus on safety significant issues; and improving the use of risk insights in emergency preparedness planning standards. The recommendations resulted from NRC's transformation efforts, stakeholder correspondence, feedback from ROP public meetings, and the staff's annual ROP self-assessment program. Those recommendations are among those currently being considered by the Commission.

FY 2021 BUDGET REQUEST

The NRC's Fiscal Year budget request focuses on the agency's priority of adapting to today's regulatory environment and evolving as the industry's business needs change. The following information highlights specific elements of the NRC's Fiscal Year budget request. Nuclear Reactor Safety.

The NRC's Nuclear Reactor Safety Program encompasses licensing and overseeing civilian nuclear power reactors, research and test reactors, and other nonpower production and utilization facilities, such as medical radioisotope facilities, in a manner that provides adequate protection of public health and safety. This program also provides reasonable assurance of the security of facilities including their protection against radiological sabotage. This program contributes to the NRC's safety and security strategic goals through the activities of the Operating Reactors and New Reactors Business Lines.

Overall resources requested in the Fiscal Year budget for the Nuclear Reactor Safety Program are $452.8 million, including 1,755 FTE. This funding level represents an increase of $26.2 million, yet includes 60 fewer FTE, when compared to the Fiscal Year enacted budget. This increased funding includes $17.7 million for continuing the development of a regulatory infrastructure for advanced nuclear reactor technologies. The staffing reductions in the Nuclear Reactor Safety Program are generally the result of efficiency gains from the aforementioned merger of the Office of Nuclear Reactor Regulation and the Office of New Reactors.

Operating Reactors The Operating Reactors Business line portion of the Nuclear Reactor Safety Program encompasses the regulation of 95 operating nuclear power reactors and 31 research and test reactors. The NRC is requesting $372.8 million for operating reactors, including 1,470 FTE, which represents an increase of $30.3 million and 13 fewer FTE when compared to the Fiscal Year enacted budget. Funding increased primarily to support: three new subsequent license renewals applications for North Anna Power Station and two additional unspecified plants; the anticipated in-

flux of accident tolerant fuel (ATF) topical reports; the development of licensing infrastructure for ATF, high-burnup and higher enrichment in both ATF and current fuel designs; and work related to the licensing of medical radioisotope irradiation and processing facilities.

New Reactors The New Reactors Business Line portion of the Nuclear Reactor Safety Program is responsible for licensing and overseeing the design, siting, and construction of new nuclear power reactors, including SMRs and advanced reactors. The new reactor activities ensure that new civilian nuclear power reactor facilities are developed in a manner that protects the health, safety, and security of the public in an efficient manner.

The Fiscal Year budget request for new reactors is $80 million, including 285 FTE, a funding decrease of $4.1 million and 47 fewer FTE when compared to the Fiscal Year enacted budget. The decreases are primarily due to the completion of reviews for a design certification and early site permit application. The NRC is preparing for the anticipated transition of the Vogtle Electric Generating Plant, Unit 3 in Georgia from construction to operations later this calendar year. The NRC also expects to begin the review of one advanced non-light-water reactor combined license application for OKLO and to complete the review of a design certification application for an SMR for NuScale. In addition, the NRC anticipates engaging in in preapplication activities with several small modular and advanced reactor applicants, as well as undertaking several rulemakings associated with new reactor activities.

The NRC continues to focus on activities related to the development of regulatory infrastructure to support reviews of advanced reactor technologies. Regarding future new reactors, the NRC continues to interact with vendors about prospective SMR and advanced reactor applications. Additionally, we will continue to refine our regulatory processes as we prepare to review these potential applications.

In support of this, in December, the agency published for public comment a proposed rule to amend its regulations to create an alternative emergency preparedness (EP) framework for SMRs and other new technologies by adopting a risk-informed, performance-based, and technology-inclusive approach. This proposed rule recognizes technological, engineering, and design advances by crediting the safety enhancements in evolutionary and passive cooling systems, which would minimize the need for human intervention in accident scenarios and would slow the progression to a potential release of fission products to the environment. This approach is consistent with the NRC's history of licensing facilities with requirements commensurate with their risk. For example, the NRC prescribes fewer requirements at research and test reactors under its EP regulations because of the lower risk present for those facilities. Similarly, the NRC has historically scaled its requirements at certain power reactors, such as Fort Saint Vrain, that presented a lower hazard profile than typical large-light-water reactors, including reduced emergency planning zones with a range of 5 miles rather than the typical 10 miles.

Nuclear Materials and Waste Safety The Fiscal Year budget request for the Nuclear Materials and Waste Safety Program is

$125.6 million, including 462 FTE. These funding levels represent an increase of $5.4 million and a decrease of 19 FTE when compared to the Fiscal Year enacted budget. This program encompasses the NRC's licensing and oversight of nuclear materials. The budget request does not include funding for licensing activities related to the proposed Yucca Mountain geologic repository for disposal of spent fuel and other high-level radioactive waste.

The agency's work in this area provides assurance of the physical security and protection against radiological sabotage, theft, or diversion of nuclear materials. Through this program, the NRC regulates uranium processing and fuel facilities; research and pilot facilities; and other nuclear material uses such as medical, industrial, research, and academic. Additionally, through this program, the NRC regulates: spent fuel storage; transportation and packaging of spent fuel and other nuclear material; decontamination and decommissioning of facilities; and low-level and high-level radioactive waste.

Spent Fuel Storage and Transportation The Spent Fuel Storage and Transportation Business Line portion of the Nuclear Materials and Waste Safety Program supports the safe and secure storage of spent fuel and the safe and secure transport of radioactive materials. The Fiscal Year budget request for spent fuel and transportation is $28.1 million, including 102 FTE. These funding levels represent an increase of $5.2 million when compared to the Fiscal Year enacted budget. Resources increase to support the development of the technical bases, or underlying rationale, for reviewing transportation packages for ATF and the development of guidance and regulatory infrastructure to conduct safety reviews for high-burnup and enrichment extension fuel designs that may be submitted in future license applications. During Fiscal Year 1, the NRC expects to continue to perform safety, security and environmental reviews for several license applications for storage and transportation packages and to conduct safety inspections of construction, loading, and operations of Independent Spent Fuel Storage Installations.

Nuclear Materials Users The Nuclear Materials Users Business Line portion of the Nuclear Materials and Waste Safety Program supports the licensing and oversight necessary to ensure the safe and secure processing and handling of radioactive materials in medical, industrial, and academic applications. The Fiscal Year budget request for nuclear materials activities is $55.5 million, including 201 FTE, a funding decrease of $0.7 million and a decrease of 4 FTE when compared to the Fiscal Year enacted budget. The requested funding supports the completion of reviews of approximately 2,000 licensing actions, including new applications; requests from nuclear materials users for amendments, renewals, and terminations; and funding for about 900 routine health, safety, and security inspections. In addition, resources would be used to coordinate homeland security regulatory initiatives, track imports and exports, and support international activities to develop or enhance global controls over radioactive sources. Decommissioning and Low-Level Waste (LLW)

The Decommissioning and Low-Level Waste (LLW) Business Line portion of the Nuclear Materials and Waste Safety Program

supports licensing and oversight associated with the safe and secure operation of uranium recovery facilities, decommissioning of nuclear facilities, and disposition of LLW from all civilian sources. The Fiscal Year budget request for decommissioning and LLW is $22.8 million, including 86 FTE, a funding increase of $1 million and a 7 FTE decrease when compared to the Fiscal Year enacted budget. Funding increases primarily to support the transition of oversight of Duane Arnold Energy in Iowa into the decommissioning program. The Fiscal Year budget request also includes funding for decommissioning oversight of 20 reactors, five research and test reactors, 10 complex materials sites, and five private uranium mill sites. The agency also plans to conduct oversight of groundwater restoration activities at one licensed and two not-yet-constructed uranium recovery facilities.

Fuel Facilities The Fuel Facilities Business Line portion of the Nuclear Materials and Waste Safety Program is responsible for ensuring that commercial nuclear fuel cycle facilities are licensed and operated in a manner that adequately protects public health and safety and promotes the common defense and security. The Fiscal Year budget request for fuel facilities is $19.3 million, including 73 FTE, which represents a decrease of 8 FTE when compared to the Fiscal Year enacted budget. These decreases are partly due to an anticipated decrease in resources needed for hearings and legal support related to new facility submittals and to efficiencies gained through organizational restructuring within the NRC's Office of Nuclear Material Safety and Safeguards. Corporate Support The NRC's corporate support involves centrally managed activities that are necessary for agency programs to operate and achieve goals more efficiently and effectively and includes acquisitions, administrative services, financial management, human resource management, information technology and information management, training, outreach, and policy support. The Fiscal Year budget request for corporate support comprises 31 percent of the agency's total budget authority, is $271.4 million and reflects a decrease of $8 million and 23 FTE when compared to the Fiscal Year enacted budget. The budget request supports continuing efforts to modernize information technology to increase productivity and security, to leverage data as a strategic asset, to develop the agency work force, and to improve the customer experience with Federal services.

Office of the Inspector General

The NRC's Office of the Inspector General (OIG) is a statutory entity whose mission is to independently and objectively audit and investigate programs and operations to promote effectiveness and efficiency and to prevent and detect fraud, waste, and abuse. The Fiscal Year budget request for the NRC OIG is $13.5 million, which includes $11.6 million in salaries and benefits to support 63 FTE and $1.9 million in program support. These resources will support OIG auditing and investigation functions for both the NRC ($12.3 million) and the Defense Nuclear Facilities Safety Board ($1.2 million).

CLOSING

In closing, the NRC's Fiscal Year budget request reflects the resources necessary to perform our vital safety and security mission. The NRC also will continue taking steps to improve our regulatory processes and to position the agency to meet the future challenges. Chairman Barrasso, Ranking Member Carper, and distinguished members of the Committee, this concludes my written testimony. On behalf of the Commission, thank you for the opportunity to appear before you and for your support of the vital mission of the NRC. We are pleased to respond to your questions. Thank you.

Senate Committee on Environment and Public Works
Hearing entitled, *"Oversight of the Nuclear Regulatory Commission"*
March 4, 2020
Questions for the Record for Chairman Svinicki

Chairman Barrasso:

QUESTION 1: Last year, the Nuclear Regulatory Commission (NRC) entered a Memorandum of Cooperation with the Canadian Nuclear Safety Commission to collaborate on licensing of advanced nuclear reactor technologies.

a. **What NRC actions have been undertaken as a result of the Memorandum?**

b. **How is the NRC benefitting from this collaboration?**

ANSWER:

a. There has been a high level of engagement between the Canadian Nuclear Safety Commission (CNSC) and the NRC to establish a framework for cooperation on advanced reactors since the signing of the Memorandum of Cooperation (MOC). The NRC and the CNSC agreed that implementation of the MOC would be carried out under the existing NRC—CNSC Steering Committee. At the Steering Committee meeting in October 2019, the Steering Committee approved the formation of a new Subcommittee on Advanced Reactor Technologies and Small Modular Reactors (ART-SMR Subcommittee). The ART-SMR Subcommittee held its first formal meeting in October 2019, and recently held its second formal meeting in March 2020. Many informal meetings of the subcommittee have taken place as well. Work plans for several proposed areas of cooperation are under discussion. The NRC and the CNSC are proceeding to implement two of the work plans related to sharing insights on review of a small modular reactor design and exploring the convergence of regulatory approaches to improve the efficiency and effectiveness of the safety review of applications for advanced reactors in both

the U.S. and Canada. In addition, the NRC and the CNSC are engaging with several advanced reactor designers that have submitted or intend to submit advanced reactor applications for review in both countries.

b. NRC—CNSC cooperation will provide opportunities for both agencies to share scientific information about technical matters that could inform and lead to more efficient and effective safety reviews of advanced reactor technologies. For example, the NRC and CNSC are pursuing opportunities to:

- develop shared approaches to conducting technical reviews of small modular reactors and advanced reactors to resolve common technical questions and facilitate regulatory reviews that address our respective national regulations.

- collaborate on pre-licensing activities to ensure mutual preparedness to efficiently review small modular reactor and advanced reactor designs.

- cooperate on research, training, and the development of regulatory approaches for unique or novel technical considerations to ensure the safety of small modular reactors and advanced reactors.

Some advanced reactor designers have elected to participate in the process as early potential projects for NRC and CNSC cooperation because these vendors are engaging with both regulators on the same design. The NRC and CNSC have started to share information on these designs. For example, the CNSC has provided the NRC with access to information related to its Vendor Design Review process for one such designer, including inviting NRC staff to attend meetings between the CNSC and the reactor designer on technical aspects of the design. The

CNSC subsequently facilitated making information submitted to the CNSC on this topic available to the NRC staff. This information provides the NRC staff an early opportunity to familiarize itself with the design prior to receipt of pre-application submittals from the designer on similar topics for NRC review. Early access to the CNSC information should shorten the amount of time the NRC staff needs for its safety review. Likewise, the NRC is working with another vendor to provide the CNSC access to information on the NRC's review of its design.

QUESTION 2: The Nuclear Energy Innovation and Modernization Act (NEIMA) requires the NRC to establish a regulatory framework to license and deploy advanced nuclear technologies. New nuclear reactors can be smaller, safer, and more efficient. The law requires the safety rules to reflect those attributes through a risk-informed, performance-based regulatory approach. How is the Commission ensuring that safety regulations for advanced reactors are established commensurate with the risk and performance of advanced nuclear technologies?

ANSWER:

The NRC staff is making sustained progress on developing the regulatory framework directed by NEIMA, which is supporting its efforts to prepare to efficiently and effectively review advanced reactors that can be smaller, safer, and more efficient. The NRC staff has prepared a rulemaking plan to develop technology-inclusive regulations that would establish alternative safety requirements for use by applicants for commercial advanced reactors commensurate with the risks posed by advanced reactor technologies and designs. The NRC staff has discussed possible approaches with stakeholders at public meetings and plans to capitalize on the shorter-term activities that are underway at the NRC to support the longer-term rulemaking.

For example, the NRC staff has interacted with stakeholders, including the utility-led, Department of Energy (DOE) cost-shared, Licensing Modernization Project (LMP). The NRC staff has recommended that the Commission use the LMP methodology to develop a regulatory framework. The industry has performed table-top exercises to test the LMP methodology with various advanced reactor developers and has shared the results of those exercises with the NRC. The NRC is also observing the use of the LMP methodology to support the design and DOE review of the Versatile Test Reactor. The NRC staff is currently interacting with a follow-on, utility-led, DOE cost-shared project to provide additional technology-inclusive guidance on the content of licensing applications and is interacting with several advanced reactor developers that are preparing applications. The NRC anticipates that these activities will inform the longer-term rulemaking directed by NEIMA.

In addition to the LMP, the NRC is working with DOE, Department of Defense (DOD), industry groups, developers, and other stakeholders to identify and resolve potential policy and technical issues associated with microreactors, which are a subset of advanced reactors expected to produce approximately 1-20 megawatts of thermal energy. The technology-inclusive regulatory framework required by NEIMA will likely be used to address some of the microreactor-related issues and support features such as factory manufacturing, transportability, and inherent self-control features. The NRC staff is also interacting with DOE and other stakeholders to assess fusion technologies and to incorporate possible licensing and regulatory regimes for fusion reactors within the technology-inclusive regulatory framework being developed.

QUESTION 3: The NRC's inspection programs are primarily implemented by the regional offices and resident inspectors. The NRC recently provided recommendations to resolve issues of very low safety significance.

a. **How is the Commission ensuring that inspectors are not spending an excessive amount of time on issues that are of very low safety significance?**

b. **How is the Commission ensuring that the regional offices are aligned with the Commission's direction on matters of very low safety significance?**

ANSWER:

a. The agency has provided new guidance and has conducted inspector and supervisor training to ensure inspectors are not spending excessive time on issues that are of very low safety significance. Specifically, in January 2020, the NRC staff made revisions to Inspection Manual Chapter (IMC) 0612, Appendix B, "Issue Screening," and IMC 0611, "Power Reactor Inspection Reports," to provide guidance on the new Very Low Safety Significance Issue Resolution (VLSSIR) process. These IMC revisions allow inspectors to close very low safety significance issues early in the inspection process if there is a question as to whether an issue is within the facility's licensing basis and that issue cannot be resolved without a significant level of effort. IMC 0612, Appendix B provides guidance on when the VLSSIR process can be used and IMC 0611 provides guidance on the documentation to be included in an inspection report when a very low safety significance issue is closed. The NRC staff completed training of all the regional offices in October 2019 and December 2019 prior to implementation of the VLSSIR process. The NRC staff is monitoring the implementation of the process and will conduct an effectiveness review of the new VLSSIR process in January 2021.

b. To ensure alignment with the regions on matters of very low safety significance, the Office of Nuclear Reactor Regulation (NRR) engaged with the regional offices throughout the development of the VLSSIR process. Specifically, all four regions had members on the VLSSIR

working group, and the Region III Deputy Regional Administrator was the NRC executive sponsor for this new guidance. NRR provided an initial draft of the guidance to the regional offices in June 2019, and received valuable feedback that resulted in changes to that initial draft guidance. NRR sought and received further feedback from the regional offices when the initial training was provided to the regional inspectors in October 2019, and made adjustments to the process before its final issuance. From the start of the training process in October 2019, all four regions had their Regional Administrators, Deputy Regional Administrators, or both, actively participate in the training sessions and emphasize the importance of this new process. Finally, the Regions are testing the VLSSIR process by screening existing Unresolved Items (URIs) to see if any of them can be resolved using the new process.

QUESTION 4: Two years ago, the Commission launched a "Transformation Initiative" to move the agency towards a modern, risk-informed regulatory approach. It is important that changes adopted under this initiative are sustainably incorporated into the agency's culture.

a. What is the current status of the Transformation Initiative?

b. How will the Commission ensure that any resulting changes will endure throughout NRC's programs?

ANSWER:

a. The NRC is actively engaged in transforming into a modern, risk-informed regulator. The Transformation initiative has identified four focus areas: (1) recruiting, developing, and retaining a strong workforce; (2) improving decision-making through the systematic consideration of risk in the agency's decision-making process; (3) establishing a culture that embraces innovation; and (4) better enabling staff to adopt new and existing IT resources.

In October 2019, the staff launched seven Initiatives to support the four focus areas, and significant progress has been made to date. Key accomplishments include:

- development of a new framework to measure and monitor important external indicators (e.g., nuclear sector economics, political and socio-economic trends), the assessment of which will add rigor to the agency's workforce and budget planning processes; and

- completion of preparations to launch a new agency innovation program, including a technology platform and workflows for soliciting, tracking, and implementing staff ideas;

- wide-scale staff participation in training on the recently adopted Microsoft Office 365 platform to enhance collaboration and efficiency in agency workflows;

- completion of an agency-wide staff survey to identify elements of the institutional culture (i.e., norms and expectations) that should be areas of focus to support transformation.

The NRC is implementing these transformation initiatives in a phased approach that will continue through Fiscal Year 2021. The specific sequencing of transformation activities allows for iterative improvements as lessons learned from the work in earlier stages are used to refine and enhance the rollout of subsequent stages. Further, the agency is cognizant that staff's engagement with transformation will be improved if it is provided sufficient time to understand the motivations for change, adapt to new ways of working, and provide feedback to NRC leaders. On a quarterly basis, the NRC continues to give updates on the progress of transformation-related activities to the Senate Environment and Public Works Committee in the

Status Report on the Licensing Activities and Regulatory Duties of the U.S. Nuclear Regulatory Commission.

b. The NRC has worked to ensure the sustainability of change by integrating the transformation initiatives into existing agency processes. For example, the transformation activities related to information technology (IT) adoption are aligned with the agency's strategic plan for IT modernization established by the Office of the Chief Information Officer. Likewise, the agency's Office of the Chief Human Capital Officer has put in place a Strategic Workforce Planning activity that is closely tied with transformation initiatives on employees' career development and the monitoring of external indicators. Harmonization between the respective activities is led by senior leadership with oversight for the agency's entire transformation portfolio; this work is accomplished in part by specialized staff assignments for transformation working teams and through the use of diverse communications channels.

Because positive reinforcement is integral to the transformation effort, the agency is assessing new ways to reward and recognize staff for supporting transformation and innovation at the agency. The staff will also determine the extent to which coaching, or training could further the agency's transformation effort.

QUESTION 5: Test and research reactors are currently classified based on power level. The NRC staff stated during a public meeting on January 28, 2020, that revisions are being considered to better reflect a risk-informed, performance-based approach.

a. How would these revisions affect test and research reactor regulation?

b. Micro-reactors may be very similar to research and test reactors. How might the potential changes to research and test reactor regulation translate to micro-reactors?

ANSWER:

a. The Commission is considering a draft final rule that would amend, in part, the regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) related to license renewal of research reactors and testing facilities under 10 CFR Part 50 and Sections 104a and 104c of the Atomic Energy Act of 1954, as amended (AEA).[1] The revisions would enhance the NRC's risk-informed, performance-based approach to regulating these facilities by eliminating license terms for research reactors, requiring licensees to submit an updated final safety analysis report once every five years, establishing an accident dose criterion of 1 rem (0.01 Sv) total effective dose equivalent for a research reactor, and changing the definition of a testing facility. The rule would change the definition of a testing facility to be based on postulated accident criterion (greater than 1 rem) rather than reactor power level (greater than 10 megawatts or greater than 1 megawatt if certain design features are present) because the use of a postulated accident dose is more representative of the risk of a facility than the power level. Testing facilities are subject to several additional licensing requirements because they may have potentially greater risks of off-site radiological consequences compared to research reactors, and the new definition would better align with this purpose. These changes reflect lessons learned from decades of processing license renewal requests, public comments on the research reactors and testing facilities license renewal proposed rule, and Commission direction to the staff to ensure that NRC regulates research reactors and testing facilities commensurate with their risks and consistent with the AEA.

[1] "Final Rule: Non-power Production or Utilization Facility License Renewal," Commission Paper SECY-19-0062 (June 17, 2019) (ML18031A000).

b. Micro reactors are substantially smaller than existing facilities, are likely to use fewer engineered systems, structures, and components, and rely on passive and inherent safety features. This should result in micro reactor designs that are significantly smaller and less complex than existing facilities, with correspondingly reduced potential radiological consequences. In the near-term, the NRC plans to license micro reactors in the same manner as all power reactor applications for licenses or certifications under 10 CFR Part 50 or 52 and Section 103 of the AEA. The revisions to the regulations for research reactors and testing facilities described in the preceding response would only apply to micro reactors licensed under Section 104 of the AEA for research and development and not to commercial power generation facilities. However, the staff is receptive to reviewing requests for departures from the existing regulations, and such proposals would be evaluated by the staff using existing agency processes to determine whether they would ensure adequate protection of public health and safety. As a longer-term activity, the staff plans a more holistic approach to addressing unique issues associated with licensing micro reactors. Such an approach could be codified in the rulemaking to establish a technology-inclusive regulatory framework for advanced reactors by December 31, 2027, as required by NEIMA. The NRC will address any policy issues identified during the development of the approach as they arise. In both the near-term and longer-term approaches, the staff plans to leverage existing regulatory guidance and requirements for research reactors and testing facilities, as appropriate. The staff will also continue to evaluate any potential changes to the research reactor and testing facility regulations and consider how these changes could be considered in the staff's micro reactor approach.

QUESTION 6: **The NRC conducted a lesson learned assessment following the licensing of the Westinghouse AP-1000. Despite being a smaller light-water reactor design with additional safety systems, NuScale's design certification application review will be among the most expensive in history. That is the wrong trend.**

a. **What lessons learned from the AP-1000 experience were applied to NuScale's design review?**

b. **Can you point to any tangible process efficiencies in NuScale's review as a result of the AP-1000 lessons learned?**

c. **What is the NRC doing to incorporate lessons learned, manage costs, and be more efficient in future design reviews?**

ANSWER:

a. The lessons learned assessment following the AP1000 approval resulted in the identification of opportunities for additional improvement for both the applicant and the agency. These lessons were applied to the staff's safety review of the NuScale design, where applicable. For example, one lesson is that timely development and maintenance of regulatory guidance is important to support the development of a high-quality application and to contribute to an efficient regulatory review. As a result, the NRC developed Design Specific Review Standards (DSRS) to replace or supplement, as appropriate, the existing "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition" (NUREG-0800) to facilitate the design review. The DSRS was tailored for the specific and unique aspects of the NuScale design. Another applicable lesson from the AP1000 review was that high-quality applications, with a sufficient level of design detail and environmental information, are a significant contributor to overall project performance, particularly for innovative, first of a kind concepts. As a result, for the NuScale application, the NRC staff conducted a comprehensive Pre-Application Review and Acceptance Review to provide feedback to the applicant on

whether it had provided sufficient design information to enable the staff to complete the Design Certification Application review.

b. The NRC staff implemented several process efficiencies in the NuScale review. For example, the NRC staff improved the Requests for Additional Information (RAIs) process to ensure that RAIs were needed and appropriate. Managers reviewed RAIs before the staff issued them to the applicant to ensure that RAIs requested information that was necessary to make safety findings and that RAIs were clear and concise. Additionally, the staff issued draft RAIs to the applicant for review and comment before final RAIs were issued to ensure the applicant understood what information was being sought and to avoid a second round. These improvements resulted in fewer RAIs being issued for NuScale than for the AP1000.

Another process efficiency was the NRC staff's increased use of audits to better understand design issues and determine whether NuScale should be required to submit additional information to support the staff's review of its application. This enabled the staff to develop focused RAIs, where necessary, and in some cases, to eliminate the need for RAIs altogether.

Also, the NRC staff proactively implemented early identification and timely resolution of complex technical issues to manage and minimize impacts on the review schedule. This allowed the NRC staff to make timely decisions and develop a path forward on significant new concepts where existing regulations do not directly apply without impacting the design review schedule.

c. The NRC has made extensive efforts over the last several years to prepare for and apply the lessons learned from previous design and licensing reviews to new advanced reactor designs or technologies. Many of the staff's efforts are described on the NRC's public web site. Because advanced reactors are significantly different from the AP1000 and NuScale light water designs, the NRC has focused our safety reviews on the most safety and risk significant features of these new designs and technologies and developed new guidance for potential applicants. This has

included working with the industry and the U.S. Department of Energy to develop new guidance such as Draft Regulatory Guide 1353, "Guidance for a Technology-Inclusive, Risk-Informed, and Performance-Based Methodology to Inform the Licensing Basis and Content of Applications for Licenses, Certifications, and Approvals for Non-Light Water Reactors." This document was published by the NRC staff in May 2019 and recommends endorsement of industry document, The Nuclear Energy Institute (NEI) 18-04, "Risk Informed Performance-Based Technology Inclusive Guidance for Advanced Reactor Licensing Basis Development." In addition, the NRC staff published draft guidance "Non-Light Water Review Strategy Staff White Paper" in September 2019 for staff use. Also, the NRC staff is strongly encouraging pre-application engagement by applicants. Through the submission of topical reports, applicants can obtain NRC staff safety review findings on key aspects of their design; such findings would expedite the safety review of a licensing application. The use of topical reports and other pre-application documents is a significant tool for achieving the regulatory principles of clarity, reliability, and efficiency. The efforts taken by the NRC staff should help manage costs and ensure timely and efficient reviews of future license applications.

QUESTION 7: The first application for a combined operating license (COL) for a micro-reactor was submitted on March 17, 2020. This application was submitted after extensive pre-application engagement between the NRC and the applicant. The applicant expects to submit additional COLs in the future.

a. **What did the NRC staff learn from this pre-application engagement that will result in a more efficient, predictable, and affordable review of the COL application?**

b. **Will NRC incorporate the knowledge from the pending COL into future applications?**

ANSWER:

a. During extensive pre-application interactions with Oklo, Inc., the NRC staff gained a substantial understanding of Oklo's Aurora powerhouse design and the Oklo approach to meeting regulations. Through these interactions, NRC staff identified the need to develop review guidance that focused on fundamental safety functions and subsequently scaled the review to be commensurate with the risks posed by the reactor design. The NRC staff developed an understanding of Oklo's use of risk-informed and performance-based principles, details of the Aurora design, Oklo's approach to hazard and accident analyses, the structure of the anticipated application, and some of the potential policy issues raised by the application. The NRC staff's understanding of these aspects has enabled the staff to focus the safety review on key topics and develop strategies in advance of the application for addressing the regulatory challenges presented by the unique Aurora design. The efforts taken by the staff should facilitate a timely and efficient review of the license application.

b. Yes, the review performed for the first Aurora submittal will directly inform safety reviews of subsequent Aurora COL applications, as well as applications from other advanced reactors developers. The decision to construct and operate the first Aurora unit at Idaho National Laboratory, which is a well-known, thoroughly studied site that has previously undergone environmental and safety review for other projects, is expected to contribute significantly to efficiency in the NRC staff's environmental review, and much of both the safety review and the environmental review of the project at INL is expected to apply to subsequent Aurora applications at other sites. Barring design revisions, the Aurora safety case and method of meeting regulations should be the same at other sites and should significantly expedite the review of subsequent Aurora COL applications. The NRC will also incorporate pre-application experience with Oklo into interactions with other developers. .

QUESTION 8: **Accident tolerant fuels are expected to enhance the safety of our currently operating nuclear power plants. They may also allow nuclear reactors to run longer between refueling outages, which offers an economic benefit for using the fuel. Will the NRC incorporate the enhanced safety and performance of accident tolerant fuels into the regulatory requirements of nuclear power plants?**

ANSWER:

The NRC is prepared to establish new regulatory requirements or refine existing regulatory requirements in a timely manner if concept-specific accident tolerant fuel (ATF) features warrant it. The staff is proactively interacting with fuel vendors to identify issues for potential rulemaking in a timely way.

QUESTION 9: **Advanced fuels may require enrichment levels up approaching twenty percent, much higher than fuels currently in use. How is the NRC preparing to address licensing challenges associated with these new fuels?**

ANSWER:

The NRC is currently reviewing applications for fuel fabrication with enrichments up to 8 weight percent (%) Uranium 235. The NRC is also conducting activities to prepare the agency to regulate longer-term activities associated with advanced fuels with enrichments up to 19.75%.

The NRC continues to work closely with potential applicants to ensure challenges are identified and addressed early and ensure applicants submit a high-quality submittal addressing all regulatory requirements. For example, the NRC has held pre-application meetings with licensees who intend to submit license amendments to enrich fuel up to 19.75%, and an

applicant who intends to submit an application for a new fuel fabrication facility with enrichment up to 19.75%.

For fuel enrichment and fabrication facilities, the NRC has not identified any technical or regulatory challenges associated with the review of proposed designs for advanced fuels with enrichments up to 19.75%. For transportation and storage of fresh and spent fuel, the NRC is working to validate criticality codes and methods to support the review of various advanced reactor fuel types having enrichments above 8%. The NRC will also utilize the insights gained from the review of license amendments that would allow the fabrication and transportation of material enriched to up to 8% to prepare for the licensing of advanced fuels with enrichments up to 19.75%. For in-reactor fuel performance, the staff is actively reviewing several topical reports including one regarding tri-structural isotropic (TRISO) particle-based fuel performance with enrichments up to 19.75%. Once approved, this topical report can be used by TRISO-based advanced reactor designers to simplify their criticality code validation and fuel qualification licensing process.

The staff is working with DOE counterparts to investigate design and safety margin considerations throughout the fuel cycle due to the larger uncertainties introduced by new and advanced fuel types. The staff is also engaged with the advanced reactor community through the Accelerated Fuel Qualification Working Group to ensure that it has the latest information on advanced fuels and the industry's plans for licensing actions and to ensure the NRC is developing advanced reactor fuel qualification guidance as required under NEIMA.

QUESTION 10: Developers of advanced nuclear technologies are considering the use of advanced manufacturing processes, such as additive manufacturing.

a. **What regulatory challenges do these new processes pose?**

b. **Is the NRC prepared to review and approve the use of novel manufacturing processes?**

ANSWER:

a. Advanced manufacturing technologies (AMTs) do not pose regulatory challenges because the existing regulations are sufficient for licensees to use AMTs. Traditionally, structural materials and manufacturing methods for safety-related nuclear components are controlled and managed through consensus codes and standards, such as ASME, that are endorsed through regulatory guides or incorporated into the NRC regulations. Safety-related components fabricated using AMTs will be required to meet the same regulations as traditionally-fabricated components. Safety-related components that are not produced using an NRC-endorsed code or standard can be approved as an alternative under 10 CFR Section 50.55a(z). Both approaches are acceptable under appropriate circumstances. For less safety-significant components not managed or addressed by codes and standards, the NRC's regulations would allow the use of AMTs based upon risk-informed and performance-based analyses. However, the applicant will still need to comply with the appropriate regulations.

b. Yes, the NRC is prepared to review and approve the use of novel manufacturing processes. Licensees must comply with regulations so that components, whether AMT or traditionally fabricated, demonstrate the capability to meet their intended safety functions. AMT-fabricated components may require different or additional analyses and information in submittals than traditionally-fabricated components to demonstrate compliance.

To ensure staff readiness for review of AMTs, the NRC is proactively identifying the safety aspects of these technologies not addressed by codes and standards, so that generic guidance may be updated or created, as necessary. The reviews will focus on the essential safety differences between AMT and traditional manufacturing. Generic guidance can provide clarification for such applications and provide overall process transparency. In all cases, the NRC plans to work with applicants early in the process to identify the necessary technical information for any particular application to ensure a timely and efficient review process.

QUESTION 11: Experienced leaders are essential to sustaining the NRC's efforts to transform itself and to change its culture. The NRC needs leaders who see this vision and can implement and sustain real change, both procedurally and culturally. What is the Commission doing to develop leadership that will sustain today's transformational efforts?

ANSWER:

The NRC's leaders play a key role in ensuring the sustainability of transformation efforts that will result in lasting cultural changes. Our leaders hold significant influence in upholding the desired culture that is consistent with our transformation vision. Leadership development is therefore critical to maintaining the desired procedural and cultural norms, increasing employee performance, and improving organizational problem-solving and effectiveness.

To ensure that our leaders remain focused on our safety and security mission while taking ownership of the next phase of transformation, the NRC recently hosted three Supervisor Workshops focused on transformation. The first workshop was facilitated in the fall of 2019 with all the senior executives in attendance. The two successive workshops were focused on all first-line supervisors. The all first-line supervisor workshops were held in January and February

2020 and focused on the alignment of our transformation goals. Workshop activities and discussions concentrated on the four focus areas of the transformation initiative: accepting risk in our decision-making, innovating how we work, investing in our people, and utilizing technology.

The NRC also provides 360-degree assessments for our senior executives and first-line supervisors. Consistent with 5 CFR part 412, each senior executive is encouraged to complete at least one leadership assessment involving employee feedback (for example, 360 degree-type reviews) every three years to inform leadership development needs. These 360 assessment tools measure skills and styles as well as leadership strategies, management approaches, and leadership impact and effectiveness—all of which are related to aspects of the current initiative.

Other NRC programs focused on leadership development include the Leaders' Academy, the Aspiring Leaders Certificate Program (ALCP), and the Leader at All Levels Certificate Program (LCP). The Leaders' Academy provides current and future agency leaders with comprehensive, competency-based training and development opportunities for the full spectrum of leadership competencies outlined by Office of Personnel Management (OPM). The ALCP and LCP are self-paced programs that develop leadership skills at different levels. While the ALCP is for employees at grades GG 13–15 and is designed to develop future supervisors, the LCP is for employees at grades GG 7–12 and provides the opportunity to acquire and strengthen the fundamental leadership competencies that support self-awareness and self-management. The NRC's Supervisor Development Program (SDP) is a leadership development program for new supervisors which includes supervisor training at OPM as well as in-house NRC-specific courses.

Finally, the NRC offers an in-house Senior Executive Service Candidate Development Program (SESCDP) that provides targeted development for the next generation of executives. The

SESCDP combines developmental experiences that enhance executive competencies and provides opportunities for next generation executives to learn about government-wide programs and activities outside of the NRC, in preparation for a future SES role. The SESCDP includes the 360-degree leadership assessment, which assists candidates in determining those competencies they need to develop or reinforce during the program and executive development plans (EDP) that address the Executive Core Qualifications (ECQs) and development needs. These elements serve to equip the NRC's next generation of executives with the skills needed to implement and sustain real change, both procedurally and culturally. The current cohort has 25 matriculating candidates, many of whom already have been selected for leadership positions throughout the agency.

QUESTION 12: According to the Commission's end-of-year report to the Appropriations Committee, the NRC ended fiscal year 2019 with authorized carryover funding that exceeds $40 million. The amount of carryover has increased over the past few years. This is a concerning trend.

a. Why did the Commission's carryover funding increase last year?

b. What is the Commission doing to reverse this trend?

c. What is the current projected amount of carryover for the current fiscal year?

ANSWER:

a. By the end of FY 2019, the NRC experienced increased carryover balances due primarily to salaries and benefits (S&Bs) resulting from the underutilization of full-time equivalents (FTE) in the Nuclear Reactor Safety program. A major driver of the underutilization in FY 2019 can be attributed to workload decreases estimated in future FTE ceilings, e.g. the FY 2020 Implemented Budget includes a decrease of 136 FTE when compared to the FY 2019 Implemented. The large amount of FY 2019 carryover reflects workload and workforce

restructuring as the agency adapts to the changing industry landscape. The majority of carryover comes from the Reactor Safety and Corporate Support Control Points, due mainly to underutilization of FTE, Commission funding available from prior years, and prior year recoveries (de-obligations).

b. The NRC has a number of ongoing initiatives that will better align budget formulation and budget execution to support a more accurate, efficient, and risk-informed budget formulation process. The NRC is continuing efforts to invest resources in these initiatives, including the following:

(1) The first initiative is NRC's efforts to automate and better integrate our financial processes and systems such as the integration of the agency's financial and procurement systems to provide real-time data to NRC leadership to inform the utilization of resources. Additionally, the NRC is in the process of finalizing its cost-benefit guidance to incorporate cost estimating best practices and the treatment of uncertainty to support the development of realistic estimates of the costs.

(2) A second initiative is the NRC's enhanced Strategic Workforce Planning (SWP) process that is structured and data-driven. This process is conducted annually and focused on the development of strategies and action plans to ensure we have the right skills and competencies that allow us to be agile in addressing workload fluctuations and emerging needs.

and

(3) A third initiative is the expanded use of data analytics. The NRC is currently developing a Feasibility Study and an Analytics/Artificial Intelligence plan to document past, current, and proposed initiatives that would benefit from advanced IT tools and to establish a framework consistent with our transformation efforts as well as to enhance

our ability to make critical decisions about operations, policy, and regulations and to understand how resource allocations impact program objectives and outputs.

c. The NRC typically has $20 to $25 million in primarily fee-based unobligated carryover. This is approximately the amount that allows the agency to be responsive to emergent needs. While carryover is inherently difficult to predict the NRC's ability to estimate carryover at this time is even more difficult due to the pandemic and its unknown impacts. The full extent of the pandemic's impacts on the budget and carryover will not be known until the agency returns to normal operations.

QUESTION 13: The Commission has been examining how to authorize the use of digital instrumentation and controls (I&C) since 1994. To date, the NRC has limited the use of digital I&C. Commissioner Caputo testified that "[t]he use of digital instrumentation and controls has been a particular challenge for this agency, but it is also one that is fairly important for the future of the existing fleet."

a. **What will the Commission do to swiftly resolve remaining barriers that hinder the deployment of digital I&C?**

b. **Does the Commission recognize potential added benefits associated with digital I&C, such as real-time monitoring and response or increased data analytic capabilities**?

ANSWER:

a. The NRC has made significant progress in improving its guidance to enable the expanded safe use of digital I&C in commercial nuclear reactors. The NRC implemented an Integrated Action Plan (IAP) for digital I&C with four specific modernization plans to remove barriers for the implementation of digital I&C. As a result of the improvements completed to date under the IAP, licensees have been implementing digital I&C upgrades that do not require prior NRC approval. Some licensees have also announced plans to submit license amendment requests to the NRC

for more extensive digital I&C projects using the improved guidance. The NRC has also completed a number of notable digital I&C licensing actions: a first-of-its-kind complete digital replacement of the Purdue research reactor protection and control system; the design certification for the Advanced Power Reactor 1400 (APR1400) with advanced digital I&C controls, and approval of multiple digital platform vendor designs that can be employed in future upgrades to the existing fleet.

The staff is working on additional infrastructure modernization activities to further support the deployment of digital technologies. The staff is evaluating comprehensive industry-developed guidance in NEI-96-07, Appendix D, "Supplemental Guidance for Application of 10 CFR 50.59 to Digital Modifications." NEI submitted Appendix D for NRC review and endorsement in December 2018. The NRC staff issued a draft endorsement with conditions in May 2019. Currently, the NRC staff is addressing comments from NEI and other stakeholders, including proposals from NEI to revise Appendix D to allow NRC endorsement without conditions. The staff anticipates issuing the final endorsement decision in the spring of 2020 as Revision 2 to Regulatory Guide 1.187, "Guidance for Implementation of 10 CFR 50.59, Changes, Tests, and Experiments."

The staff is updating Branch Technical Position (BTP) 7-19, "Guidance for Evaluation of Diversity and Defense-In-Depth in Digital Computer Based Instrumentation and Control Systems," for evaluating potential common cause failure hazards in digital systems. The update addresses key regulatory uncertainty issues identified by industry stakeholders and provides an approach to grade the level of license reviews of potential common cause failure hazards based on safety significance. The staff published draft BTP 7-19 Revision 8 for public comment in January 2020 and plans to issue the final BTP in Fall 2020.

Finally, the staff continues to engage the industry in their development of guidance to streamline the safety-qualification of digital components from manufacturers using third party certification. NEI plans to submit NEI 17-06, "Supplemental Guidance for Acceptance of Digital Equipment using 3rd Party Certification" for NRC endorsement by issuance of an NRC regulatory guide. NEI provided draft Revision B of NEI 17-06 in September 2019 and NEI is currently resolving NRC staff comments. The NRC expects NEI to submit the draft document for formal NRC endorsement review in approximately Fall 2020.

b. Yes, the NRC staff agrees that properly developed digital technologies provide added benefits, such as replacement of aging and obsolete analog controls, real-time monitoring of safety systems, and increased data analytic capabilities of plant performance. The NRC staff supports the deployment of properly developed digital I&C safety and non-safety systems into the existing fleet and will continue to provide a clear, efficient, and safe regulatory infrastructure.

QUESTION 14: In 2016, the NRC released a draft Standard Review Plan (SRP) on foreign ownership, control, or domination (FOCD). The FOCD provisions in the Atomic Energy Act of 1954 and NRC regulations are country-neutral. Current provisions that govern America's engagement on international civil nuclear commerce, such as Part 810 authorizations provide for a country by country approach.

a. Would a country by country approach better reflect the current geopolitical outlook?

b. Are there opportunities for closer collaboration with our allies, such as Canada or the United Kingdom, compared to others, such as Russia or China?

ANSWER:

a. A country-by-country FOCD approach could potentially be crafted that would represent the current geopolitical outlook. However, currently the FOCD provisions in the AEA are country-neutral, precluding that approach. In addition to the FOCD review, the NRC also conducts a review to determine whether issuing an application would be inimical to the common defense and security. This inimicality review does consider country of origin factors.

b. As discussed in the response to Question 14a., the country-neutral approach to FOCD reviews and findings for licensing reviews is prescribed by law. However, outside of the licensing context, the NRC continues to look for opportunities to collaborate internationally. A recent example is the MOC with CNSC, discussed in response to Question 1.

QUESTION 15: Nuclear utilities must develop negation action plans if they know or have reason to believe they may be subject to NRC's FOCD requirements. Does the NRC have data regarding the cost to licensees to support the Security Subcommittees and Nuclear Advisory Committees that are required as part of these plans?

ANSWER:

No, the NRC does not have data regarding the cost to licensees to support Special Nuclear Committees (SNCs), also known as Security Subcommittees or Nuclear Advisory Committees (NACs). Since 1999, the NRC has incorporated SNCs or NACs as FOCD license conditions in seven NRC licensing actions (four SNCs and three NACs).

QUESTION 16: For several years the NRC staff has worked to determine the appropriate level of training and experience necessary to administer radioactive pharmaceuticals. The NRC staff recently recommended eliminating specific training and experience

requirements for physicians to be able to prescribe and use therapeutic radiopharmaceuticals. The NRC staff's recommendation is intended to reduce regulatory overlap and burden for physicians. How is the Commission balancing the NRC staff's recommendations against feedback from stakeholders, to increase patient access to therapeutic radiopharmaceuticals consistent with the NRC's policy not to interfere with the practice of medicine?

ANSWER:

In a recent paper to the Commission the NRC staff recommended initiating a rulemaking to remove prescriptive training and experience requirements, eliminate the NRC's role in reviewing and approving authorized user physicians, and revise the NRC's medical specialty board recognition criteria so that certification by boards other than nuclear medicine and radiation oncology boards would satisfy the training and experience requirement.[2] Under this proposal, authorized user physicians would still be required to meet training and experience requirements for the medical use of isotopes; however, the radiation safety training requirements would be set by medical specialty boards. The NRC staff's recommendation would retain NRC and Agreement State's role of reviewing and granting specialty board recognition and periodic monitoring of medical specialty boards' continued compliance with the radiation safety training criteria.

The Commission's current policy on the Medical Use of Byproduct Material provides, in part, that the NRC will not intrude into medical judgments affecting patients, except as necessary to provide for the radiation safety of workers and the general public, and that the NRC will, when

[2] "Rulemaking Plan for Training and Experience Requirements for Unsealed Byproduct Material (10 CFR Part 35)," Commission Paper SECY-20-0005 (Jan. 13, 2020) (ML19321E358).

justified by the risk to patients, regulate the radiation safety of patients primarily to assure that the use of radionuclides is in accordance with the physician's directions.

If the Commission approves the staff recommendation, a rulemaking process would be initiated that will ensure that all stakeholders have opportunity to inform the Commission's decisions.

QUESTION 17: **The NRC staff recently proposed development of a new regulatory guide on volcanic hazards assessment for new nuclear power plants. The staff's analysis cited the need to develop this regulatory guide because several prospective applicants may consider sites with known volcanic hazards, such as Idaho or Washington State. The sites in question host Department of Energy sites that have a long history of siting nuclear reactors and other radiologic facilities.**

a. **With the increased safety features of advanced nuclear technologies and previous nuclear facilities in those regions, why is the staff considering this additional layer of regulation?**

b. **NEIMA requires the completion of both near-term and long-term actions to support the development of advanced nuclear technologies. Is the staff's volcanic hazards activity a priority relative to the other work that is necessary to meet NEIMA's deadlines?**

c. **How many staff hours and dollars have been spent on this project thus far?**

d. **Have all activities thus far been funded using money that is subject to the Commission's fee-recovery requirements?**

e. **If it is a lower priority, will you defer additional work on the study?**

ANSWER:

a. The proposed regulatory guide is not an additional layer of regulation but a clarification of how existing regulatory requirements for site characterization with respect to volcanic hazards can be met. As stated in Title 10 of the *Code of Federal Regulations* Section 100.23, new reactor applicants must "investigate all geologic and seismic factors (for example, volcanic

Senator BARRASSO. Thank you.
Commissioner Baran.

STATEMENT OF HON. JEFF BARAN, COMMISSIONER, U.S. NUCLEAR REGULATORY COMMISSION

Mr. BARAN. Thank you, Chairman Barrasso, Ranking Member Carper.

Thank you for the opportunity to testify today. It is great to be back with my colleagues to discuss NRC's work.

Chairman Svinicki provided a good overview of NRC's current activities and budget request. I want to focus on a key aspect of the agency's work: our inspections. To protect the public, it is important for NRC to set strong health and safety standards and then ensure that those standards are met by conducting rigorous, independent inspections.

Safety and security inspections are at the heart of what NRC does to ensure that nuclear power plants operate safely. The Reactor Oversight Process is NRC's basic framework for overseeing the safety of the Nation's nuclear power plants. It affects every power reactor in the Country.

The ROP has generally been an effective safety framework; however, some stakeholders have proposed far-reaching changes to how NRC oversees the safety and security of nuclear power plants, and the NRC staff has made some troubling recommendations along these lines. There is now a long list of core safety inspections facing potential cuts.

There are proposals to reduce the frequency of comprehensive engineering inspections. There is a separate recommendation to reduce the frequency of NRC's problem identification and resolution inspections. This is the only baseline NRC inspection that looks at a plant's safety culture. Cuts to reactor safety, emergency preparedness, and radiation protection inspections are also being contemplated.

With respect to security, the agency is looking at cutting the number of force-on-force exercises in half. In addition, dramatic cuts to dry cask storage inspections are being discussed. The reactor oversight process has never been static, and I don't think it should be. There is room for innovation, for risk-informing, and for real efficiencies.

We don't need to settle for the status quo, but NRC shouldn't cut inspections to save money. That is not being more efficient or more risk-informed, that is just doing less. In my view, we should pursue changes that would improve NRC oversight, not weaken it.

Thank you, and I look forward to your questions.

Senate Committee on Environment and Public Works
Hearing entitled, *"Oversight of the Nuclear Regulatory Commission"*
March 4, 2020
Questions for the Record for Commissioner Baran

Chairman Barrasso:

1. During the hearing, you said three times that staff recommendations to revise inspection requirements were done just to "save money." You testified, "I am very concerned about a lot of the proposals to reduce inspections in order to save money."

    a. As stated on NRC's website, the agency's vision is to "Demonstrate the Principles of Good Regulation (independence, openness, efficiency, clarity, and reliability) in performing our mission." NRC's *Principles of Good Regulation*[1] state, in part, that "*[w]here several effective alternatives are available, the option which minimizes the use of resources should be adopted.*" Do you support the NRC's vision and the *Principles of Good Regulation*?

Response:

Yes. I strongly believe that achieving NRC's vital public health and safety mission must be our number one priority.

    b. Please share evidence that NRC staff's recommendations are being made, as you suggested, "just to save money."

Response:

NRC staff policy papers have explicitly claimed lower costs as a primary benefit of reduced inspections. For example, the staff's paper recommending a reduction in the frequency of comprehensive engineering inspections for nuclear power plants examined three options: conducting a comprehensive engineering inspection every three years, every four years, or every five years. The staff focused on the "annual inspection resource savings" of 12 percent, 16 percent, and 19 percent, respectively. The paper's section on "Resources" noted: "The recommended changes would result in an annual inspection resource savings of approximately 16 percent in engineering inspection effort. Sixteen percent translates into a reduction of approximately one to two full time equivalent staff positions per region, depending on the number of sites in the region."

Similarly, in a policy paper recommending a reduction from two force-on-force inspections at each nuclear power plant every three years to one force-on-force inspection, "resource savings" were prominently discussed in the staff's presentation of the policy options. According to the NRC staff, one of the principal disadvantages of maintaining two force-on-force inspections was "that it provides the smallest resource savings for both the NRC and industry." On the other hand, the staff argued that cutting force-on-force inspections in half "will provide the largest reduction in [direct inspection effort] hours and would also provide some resource savings by only performing one NRC-conducted FOF exercise." The staff further explained: "This option is estimated to result in resource savings for licensees through the elimination of one FOF exercise and the associated staffing requirements."

The NRC staff's evaluation of other recommended inspection changes cited cost savings as a major consideration. For instance, in a paper recommending several changes to the Reactor Oversight Process, the staff asserted that reduced NRC oversight of nuclear power plants would result in "less regulatory burden and expenditure of resources." The staff explained: "If the Commission approves the staff recommended changes to the baseline inspection program (excluding engineering and security inspections), the staff estimates a resource reduction of approximately 11.4 FTE in fiscal year (FY) 2020 and FY 2021 in direction inspection effort ... Of the 11.4 FTE estimated resource reduction, 10.9 FTE is attributed to reduced direct inspection performed by resident inspectors."

c. Do you believe it is appropriate for Commissioners to question the motives of career staff?

Response:

I am a strong believer in focusing policy discussions on the merits of a given policy rather than on the motives of individuals and organizations. My concerns with the proposed inspection cuts discussed in my opening statement and during the hearing were focused on the negative effects of those cuts, including weaker NRC safety oversight of nuclear power plants.

2. Your testimony stated, "[w]e don't need to settle for the status quo" and suggested that "[t]here is room for innovation, for risk-informing, and for real efficiencies." However, your testimony only included examples of regulatory changes that you do not support.

   a. Please provide examples of risk-informed regulatory changes that you support and include an explanation of what, if any, efficiencies will be or have been gained by the change.

Response:

Although I do not support reducing the frequency of the comprehensive engineering inspection for nuclear power plants, I do support the NRC staff's proposal to update the content and focus of each year's engineering inspection. I believe this would improve both safety and efficiency. As recommended by the staff, the current Design Bases Assurance Inspection and some other regional team engineering inspections could be replaced by a Comprehensive Engineering Team Inspection (CETI) and Focused Engineering Inspections (FEIs). The CETI would verify the ability of plant components to perform their licensing basis functions following plant modifications. Elements of the current heat sink and 50.59 inspections would be rolled into the CETI. In my view, CETIs should be performed every three years. In the years a CETI is not performed at a plant, a FEI would be performed instead. These inspections would more narrowly focus on a particular engineering area, which would change each year. Examples of potential focus areas include fire protection, power-operated valves, and external hazards.

There is a solid safety basis for moving from the current Design Bases Assurance Inspection to the CETI and FEIs. The newly designed inspections are the result of feedback from inspectors in the field. For safety reasons, the NRC staff's Engineering Inspection Working Group concluded that a stand-alone engineering team heat sink inspection was not useful and that elements of the inspection should be incorporated into the new CETI. The Working Group found that "because of the small population of heat exchangers/sinks, inspectors routinely inspect the same four or five heat exchangers/sinks every 3 years" and "recent changes at the sites would not likely result in engineering challenges to the heat sink equipment performance."

Similarly, "based on feedback from inspectors currently informing inspections," the Working Group determined that it would be beneficial to both safety and efficiency to review plant modifications and the associated use of the 50.59 process together, rather than separately as is done now. The safety advantage of the FEI is that it will focus on different and often uninspected, safety-significant areas each year. This provides the NRC staff with the flexibility to shift the engineering inspection focus to areas of emerging need as the nuclear power plant fleet ages.

Rather than reducing the frequency of problem identification and resolution (PI&R) inspections, I think that we should find ways to make this important inspection more effective. This critical inspection evaluates the adequacy of a nuclear power plant's corrective action program. It is also the only baseline NRC inspection that looks at a plant's safety culture. The presence of an effective corrective action program is a fundamental premise of the ROP. If a plant cannot identify and fix problems, that has a clear impact on safety. So this is a crucial NRC inspection. However, it has not been that effective at detecting challenges with corrective action programs. None of the plants that ended up in Column 4 in recent years had significant PI&R findings before moving to Column 4. But when NRC inspectors took a close look at these plants once they entered Column 4, they discovered major problems with their corrective action programs. My view is that we need to improve the effectiveness of this inspection, not reduce its frequency. We should spot corrective action program weaknesses before a plant moves to Column 4. And we need to be able to promptly detect any adverse trends in a plant's safety culture. The NRC staff is in the midst of a comprehensive review of the PI&R inspection, and I look forward to considering the staff's findings.

The NRC staff is also conducting a review of the cross-cutting issues program, which I believe would benefit from a fresh look. This program is supposed 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 current thresholds for identifying a cross-cutting theme at a plant are very high. For example, it could take 20 overall human performance findings at a plant during a one-year period to trigger action under the program. As a result, the thresholds have rarely been met, even at plants that had major performance problems. The idea behind the cross-cutting issues program is good, but we need to make it more effective.

b. In a world of ever-evolving and advancing technology, more operating experience, and greater understanding and utilization of data, do you believe it is reasonable and logical to periodically reassess what is necessary for maintaining "reasonable assurance of adequate protection" to public health and the environment?

Response:

Yes, provided that the primary focus of the reassessment is on maintaining or enhancing the safety and security of nuclear facilities.

c. Is it appropriate for the NRC to periodically assess and adjust the level of oversight it provides to licensees that reflects improved technology, operational experience, and knowledge? Why or why not?

Response:

Yes. The Reactor Oversight Process has never been static, and I do not think it should be. However, improved performance of operating facilities is not a basis for weaker safety standards or reduced NRC oversight. NRC oversight positively impacts licensee performance. Improvements in plant or fleet performance do not occur in a vacuum. NRC standards and inspections contribute significantly to those improvements.

d. What factors should the NRC consider when assessing the effectiveness and efficiency of its regulatory programs?

Response:

The particular factors to consider will depend on the specific regulatory program being assessed. For a given baseline reactor inspection, it is important to consider a variety of factors, such as the purpose and history of the inspection, the safety significance of the component, process, or activity being inspected, the number and level of inspection findings in this area, the effectiveness of the inspection in detecting safety or security issues in the area of focus, emerging areas of concern that could be addressed by the inspection, the frequency and typical schedule of the inspection, the relevant areas of expertise necessary for inspectors, and the overall level of effort for the inspection.

e. When a data-driven approach demonstrates improved safety, should the NRC revise its regulations to reflect such data?

Response:

This is a difficult question to answer in the abstract. Decisions about whether to revise a particular regulatory requirement certainly benefit from data related to operating experience, Reactor Oversight Process findings, and a range of other factors relevant to that requirement. Regulatory decisionmaking also needs to broadly consider the impact of a revision on the performance of NRC's health and safety mission and on public confidence.

Senator Markey:

3. On November 4, 2019, the Nuclear Regulatory Commission (NRC) approved a request to exempt the Pilgrim Nuclear Power Station from regulations for emergency planning and preparedness. This decision meant that Pilgrim was exempt from regulations that require the maintenance of offsite emergency response capabilities or procedures for public notification, even before all of the spent nuclear fuel was moved into dry cask storage. Do you believe that there is merit in maintaining safety and emergency response protections while nuclear spent fuel still cooling in open pools?

Response:

Yes. FEMA and many states, including Massachusetts, recommend that NRC require dedicated radiological emergency planning with a 10-mile emergency planning zone until all spent nuclear fuel at a site is removed from the spent fuel pool and placed in passive, dry cask storage. I support this approach, which would provide defense-in-depth to protect the public, while ensuring that FEMA will continue to play its vital role in assessing the adequacy of offsite emergency response plans at decommissioning nuclear power plants.

This approach also accounts for the earthquake risks at the Pilgrim site, which are greater than previously understood. In May 2014, as part of the post-Fukushima seismic hazard re-evaluation, NRC published updated ground motion response spectra for Pilgrim. The results revealed the potential for an earthquake at Pilgrim significantly stronger than the safe shutdown earthquake the plant was designed to handle. In fact, the gap between the previously understood seismic risk and the updated seismic risk was larger at Pilgrim than at any other nuclear power plant in the country.

4. Starting in 2004, nuclear power plants in the United States used the Composite Adversary Force (CAF) managed by the Nuclear Energy Institute (NEI) as a mock attack force for NRC's force-on-force security exercises. However, in 2018, NextEra and Entergy left NEI and are no longer using NEI's CAF. Instead, NextEra and Entergy created a Joint Composite Adversary Force (JCAF) comprised of staff from their reactor fleets. How can the NRC work to ensure consistency in quality of force-on-force testing amongst all nuclear power plants?

Response:

I support entering into an agreement with the West Virginia National Guard Critical Infrastructure Protection Battalion to provide a single mock adversary force for force-on-force exercises at every operating nuclear power plant in the country. The battalion is widely recognized as an expert in vulnerability assessments for critical infrastructure across the United States. It is interested in performing this service for NRC and could provide a well-trained mock adversary force that would avoid any actual or perceived conflicts of interest. This approach would provide a completely objective adversary force focused exclusively on the national interest. The agreement between NRC and the West Virginia National Guard would ensure the continued availability of the mock adversary force in the event that the unit is mobilized. This approach would also ensure consistency in the quality of force-on-force exercises at nuclear power plants across the country.

Senator Whitehouse:

5. Is the NRC going to make it a priority to look at technologies that convey the collateral advantage of putting an alternative use to what is now a big liability and a big hazard sitting out there, which is our current nuclear waste stockpile?

Response:

As with other non-light-water reactor designs, I support the agency promptly reviewing any applications submitted by vendors for new technologies and designs.

Senator BARRASSO. Well, thank you very much for your testimony.

Commissioner Caputo.

STATEMENT OF HON. ANNIE CAPUTO, COMMISSIONER, U.S. NUCLEAR REGULATORY COMMISSION

Ms. CAPUTO. Good morning.

I would like to add my thanks to the committee for inviting us to testify today, and while I support the statement made by the chairman, I would like to add a couple of my own thoughts with regard to transformation and budgeting.

While safety is our mission, our principles of good regulation are central to achieving that mission. The Principle of Efficiency states "the American taxpayer, the rate-paying consumer, and licensees are all entitled to the best possible management and administration of regulatory activities." To me, this is at the core of our transformation efforts. To me, transformation of anything begins with a question: is there a better way to do this?

The NRC has over 45 years of experience regulating nuclear energy and materials. Taking this experience and harnessing modern technology is key to making data-driven, risk-informed, and performance-based decisions.

This is at the root of continually striving for the best possible management and administration. I believe this was reflected in the letter we received from several of the committee members with regard to our efforts to consider enhancement of the Reactor Oversight Process that my colleague, Commissioner Baran, just mentioned.

Budgeting, I believe, is another area where we need to implement more data-driven decisionmaking. In 2017, the GAO noted that we use two different accounting systems for budget formulation and budget execution. This remains true today. We should use actual expenditures to achieve more data-driven, accurate budgets in the future. Financial management, I don't believe, should be exempt from our agency's transformation efforts.

Thank you, and I look forward to your questions.

Senate Committee on Environment and Public Works
Hearing entitled, *"Oversight of the Nuclear Regulatory Commission"*
March 4, 2020
Questions for the Record for Commissioner Caputo

Senator Whitehouse:

QUESTION 1: **Is the NRC going to make it a priority to look at technologies that convey the collateral advantage of putting an alternative use to what is now a big liability and a big hazard sitting out there, which is our current nuclear waste stockpile?**

ANSWER:

The NRC stands ready, as the independent regulator of the commercial use of nuclear power and nuclear material, to review new, advanced reactor technologies, including those that utilize different sources of fuel. The DOE is responsible for overseeing and implementing strategies for managing spent nuclear fuel, including alternative uses of spent nuclear fuel consistent with national policy and statutes. The NRC closely coordinates with DOE to keep abreast of implementation of the national policies with regard to the management of spent fuel and periodically solicits industry input to ensure we have the most up to date information on industry plans that may require NRC licensing. As an independent safety and security regulator, the NRC is responsible for ensuring that spent nuclear fuel is managed safely and securely. Consistent with its role as an independent regulator, the NRC will continue to support the national program for spent nuclear fuel, including reviewing applications for any new technologies related to the processing and disposition of the nation's spent nuclear fuel.

Senator BARRASSO. Thank you very much.
Commissioner Wright.

THE HONORABLE DAVID WRIGHT, COMMISSIONER, U.S. NUCLEAR REGULATORY COMMISSION

Mr. WRIGHT. Thank you. Good morning Chairman Barrasso, Ranking Member Carper, and esteemed members of the Committee. Thank you for the opportunity to testify today.

I would like to start by thanking my colleagues and the NRC staff. I have learned so much from each of my fellow commissioners, and appreciate their collegiality and insights on each of the matters that come before the commission.

I would also like to thank the NRC staff for their work and dedication to the agency's critical safety mission. I am humbled by their efforts, both in evaluating complex safety, security, and environmental matters in the first instance, and in reexamining those issues when needed to ensure the public is adequately protected.

In walking the halls of the NRC and visiting facilities over the last 2 years, I have gained invaluable insights into the agency's priorities, successes, and challenges. What I have learned is that our priority and our success are easy to define. It is the safe and secure operation of the civilian nuclear fleet, and this is the shared goal of the commission, the staff, and our licensees.

The challenge is how to reach that goal in the most effective and reliable way possible, while dealing with uncertainties, new information, changes in the regulatory environment, and new technologies. I believe the NRC is up to the challenge. I am excited by the energy around the agency's transformation and innovation initiatives, as it demonstrates how willing and able the NRC is to turn a critical eye inward to examine ways to improve and account for new information, data, and technologies. I am impressed by the staff's hard work and creative, thoughtful ideas.

I am also pleased to see the work we are doing to improve our budgeting processes in response to the Nuclear Energy Innovation and Modernization Act. I am following how this all motivates other changes in how we do our work. I see change as an opportunity. Change in how we perform our work is an opportunity to use data and experience to recalibrate our activities to be a smarter, more effective regulator prepared to regulate both existing and new technologies.

Thank you, and I look forward to your questions.

activity) that may affect the design and operation of the proposed nuclear power plant irrespective of whether such factors are explicitly included in this section." Recognizing the range of reactor facilities that may be sited in volcanic terrain, the draft guide outlines a method that applies risk insights at numerous steps within the process and allows for a prospective applicant to simplify the analysis if the risk is acceptable. In addition to providing regulatory consistency and clarity, the draft guide is also consistent with risk-informed decision making by using risk insights throughout the analysis.

b. The staff's work in volcanic hazards is unrelated to NEIMA actions. There is no overlap in staff working on the draft guide that are also assigned to NEIMA-related work.

c. As of March 23, 2020, the estimated staff hours are less than 920. The staff expended approximately $80,000 on this draft guide to date.

d. Yes, all activities thus far have been supported by funding that is subject to the Commission's fee-recovery requirements. The draft guide was developed for use by any prospective applicant in the United States, not only advanced reactors. As such, the staff time for this effort was charged using funding that is subject to the Commission's fee-recovery requirements.

e. As stated in the answer to b.) above, there is no overlap in staff working on the draft guide that are also assigned to higher priority NEIMA work. Therefore, the staff does not anticipate the need to delay work on the draft guide. The draft guide has just been released to the public making it available for use and comment. Significant effort in finalizing the guidance is not expected during the next 18 months.

Senator BARRASSO. Well, thank you very much to all of you for your testimony.

There have been a couple of reports that we have seen. I am going to make comments on both.

First is, last week, the Nuclear Regulatory Commission's Office of the Inspector General issued a report. It found flaws in the staff's safety review of a gas transmissions line that crosses the property of the Indian Point, New York nuclear site.

Chairman Svinicki immediately directed the agency's senior staff to review the analysis and recommended actions to prevent this from happening again. I appreciate the chairman's leadership on this. I ask unanimous consent to enter into the record Chairman Svinicki's memorandum to the Executive Director of Operations and the staff's response. Without objection, that is admitted.

[The referenced information follows:]

Senator Markey:

QUESTION 18: Under this current administration, the Nuclear Regulatory Commission (NRC) has been highlighting its "risk-informed" approach in recent decisions. This approach has been cited in some of the NRC's proposed inspection reductions, including cuts to independent spent fuel storage installation (ISFSI) inspections and changes to the Reactor Oversight Process (ROP). The NRC's emphasis on this kind of decision-making seems to have led to a consistent series of cuts to oversight hours or other reductions in NRC involvement. Can you cite a recent example of a "risk-informed" increase in regulatory oversight?

ANSWER:

Yes, within the past year, the NRC made risk-informed decisions to increase regulatory oversight in several instances:

- In May 2019, NRC inspectors identified concerns regarding degraded paint inside the reactor containment of the Fermi nuclear plant that could potentially impact safety-related systems during a design basis accident. The staff conducted a formal risk assessment and based on the results, the NRC launched a reactive inspection to assess the impact of that condition. As a result of that inspection, the NRC issued the licensee a Confirmatory Action Letter to ensure the issue is promptly corrected.

- In February 2017, LaSalle County Station identified the failure of a safety-related valve in the plant. In response, the NRC used risk insights to conduct two significant inspection activities. First, the NRC conducted a reactive inspection at LaSalle to ensure appropriate corrective actions were taken. Second, the NRC developed a new inspection to evaluate industrywide corrective actions. As part of that

inspection, the NRC used plant-specific risk insights to ensure that high risk valves were being repaired promptly, and that the performance of lower risk valves was adequately monitored.

- As to the oversight program for Independent Spent Fuel Storage Installations (ISFSIs), there will be an increase in inspections for licensees during their preoperational activities and during extended loading campaigns due to the risk significance of those activities. Overall, there will be an approximately 20 percent increase in effort for those activities that are most risk-significant, including preoperational inspections, and an annualized decrease of approximately 20 percent in the total effort for more routine, less risk-significant recurring loading and monitoring inspections. These changes will also reduce existing overlap with other inspection areas.

- Similarly, enhancements to the fuel cycle inspection program reflect increases in inspection effort for the areas and activities most important to safety. For example, there will be an increase in inspection effort in the area of plant operations, which includes chemical and criticality safety and is one of the more risk-significant areas inspected by the NRC.

QUESTION 19: I am concerned about reports that NRC Region II staff have been spearheading an effort to cut independent spent fuel storage installation (ISFSI) inspections. There are several alarming allegations, including that Region II ISFSI inspectors are not qualified to perform ISFSI inspections and that they are not following proper inspection requirements for a loading campaign. Has NRC recently assessed ISFSI inspection capabilities across its regions, and if so, what were its findings? Can

you confirm that all regional staff are fully satisfying the requirements for ISFSI activities?

ANSWER:

In 2019, an NRC staff working group was formed to evaluate and enhance the NRC's ISFSI inspection program by developing a more risk-informed, comprehensive, and consistent approach to oversight of spent fuel storage across NRC regional offices. The working group comprised individuals representing all four regional offices and NRC Headquarters and included specially trained and qualified ISFSI inspectors and a reactor resident inspector.

The working group's recommendations included enhancements to the training and qualification of inspectors, which will provide for greater flexibility and efficiency in the implementation of the ISFSI inspection program, and a cross-qualification program to better leverage existing fully qualified reactor inspectors. This cross-qualification program streamlines the training and qualification process for qualified reactor inspectors.

ISFSI inspections are conducted using appropriate inspection procedures, including the requirements for inspector qualification. The working group formed to holistically evaluate the program concluded that the program was effective. As such, the NRC staff's assessment demonstrates that our current ISFSI inspection program provides appropriate oversight and is being implemented in a manner that assures adequate protection of public health and safety.

QUESTION 20: In December 2019, several of my Senate colleagues and I sent a letter to the NRC outlining our concerns about the NRC's staff proposal to reduce the frequency and stringency of spent nuclear fuel site inspections. As we state in the letter, NRC staff have proposed to slash some ISFSI inspections by up to 88 percent, according to the

staff's presentation. Do you support the staff proposal to drastically cut ISFSI inspections, especially considering the recent high-profile spent fuel canister loading incident that happened at the San Onofre nuclear plant?

ANSWER:

The agency engages in continuous improvement activities to enhance the independent spent fuel storage installation (ISFSI) oversight program. The staff recommendations provide for a more risk informed inspection program that focuses on those areas most important to safety. These changes continue to ensure safety as well as a comprehensive and consistent inspection program. The enhancements to the program reflect an increase in inspection level of effort for spent fuel storage activities that are most important to safety and a decrease in inspection for certain other activities. In addition, the enhancements provide for greater inspection flexibility during more risk-significant ISFSI operations. Overall, there will be an increase in effort for those activities that are most risk-significant, including preoperational inspections, and an annualized decrease in the total effort for more routine, less risk-significant recurring loading and monitoring inspections. This will also reduce overlap with other inspection areas.

Additionally, as part of this effort, the staff evaluated operational experience associated with reactor sites performing extended ISFSI loading campaigns, including insights gained from spent fuel storage at the San Onofre Nuclear Generating Station (SONGS) ISFSI, and recommended the frequency of these inspections be revised from "as necessary" to quarterly throughout the extended loading campaign, to ensure that inspections are conducted on a consistent basis during continuous loading campaigns.

Although operational experience was generally considered, the performance of individual licensees was not used as the basis to make changes to the program at large. The

recommended changes to the ISFSI inspection program are intended to ensure that the program continues to have sufficient flexibility for the NRC to adjust its oversight activities when needed based on individual licensee performance. For example, the NRC Region IV office adjusted the frequency of inspections of the fuel loading campaign at SONGS to a monthly basis.

QUESTION 21: **Starting in 2004, nuclear power plants in the United States used the Composite Adversary Force (CAF) managed by the Nuclear Energy Institute (NEI) as a mock attack force for NRC's force-on-force security exercises. However, in 2018, NextEra and Entergy left NEI and are no longer using NEI's CAF. Instead, NextEra and Entergy created a Joint Composite Adversary Force (JCAF) comprised of staff from their reactor fleets. What is the NRC doing to ensure consistency in quality of force-on-force testing amongst all nuclear power plants**?

ANSWER:

Following Entergy's and NextEra's decision to discontinue membership with NEI, the Commission approved the staff's recommendation to institute long-term use of one or more industry-managed mock adversary forces (MAF) and to allow industry to implement and manage the MAFs for use during NRC-conducted force-on-force (FoF) exercises. The Commission further directed that the approval of any new MAF beyond the existing NEI CAF and NextEra's/Entergy's JCAF should use a comparable level of oversight (e.g., would involve the NRC staff's review of the associated proposal and implementation plan). The NRC maintains operational oversight of FoF exercises, including the MAF's actions during all exercises. Since initiation of the CAF and JCAF, the NRC staff has conducted oversight of these forces' training activities to ensure they meet the NRC's performance standards and can replicate the characteristics of the Design Basis Threat adversary. The NRC will also continue

to ensure separation and independence between a MAF team and a site's guard force during exercises by reviewing the list of exercise participants during each inspection and ensuring that a MAF team member does not serve as an adversary at his or her home site.

Senator Whitehouse:

QUESTION 22: Is the NRC going to make it a priority to look at technologies that convey the collateral advantage of putting an alternative use to what is now a big liability and a big hazard sitting out there, which is our current nuclear waste stockpile?

ANSWER:

The NRC stands ready, as the independent regulator of the commercial use of nuclear power and nuclear material, to review new, advanced reactor technologies, including those that utilize different sources of fuel. The DOE is responsible for overseeing and implementing strategies for managing spent nuclear fuel, including alternative uses of spent nuclear fuel consistent with national policy and statutes. The NRC closely coordinates with DOE to keep abreast of implementation of the national policies with regard to the management of spent fuel and periodically solicits industry input to ensure we have the most up to date information on industry plans that may require NRC licensing. As an independent safety and security regulator, the NRC is responsible for ensuring that spent nuclear fuel is managed safely and securely. Consistent with its role as an independent regulator, the NRC will continue to support the national program for spent nuclear fuel, including reviewing applications for any new technologies related to the processing and disposition of the nation's spent nuclear fuel.

Senate Committee on Environment and Public Works
Hearing entitled, *"Oversight of the Nuclear Regulatory Commission"*
March 4, 2020
Questions for the Record for Commissioner Wright

Senator Whitehouse:

QUESTION 1: **Is the NRC going to make it a priority to look at technologies that convey the collateral advantage of putting an alternative use to what is now a big liability and a big hazard sitting out there, which is our current nuclear waste stockpile?**

ANSWER:

The NRC stands ready, as the independent regulator of the commercial use of nuclear power and nuclear material, to review new, advanced reactor technologies, including those that utilize different sources of fuel. The DOE is responsible for overseeing and implementing strategies for managing spent nuclear fuel, including alternative uses of spent nuclear fuel consistent with national policy and statutes. The NRC closely coordinates with DOE to keep abreast of implementation of the national policies with regard to the management of spent fuel and periodically solicits industry input to ensure we have the most up to date information on industry plans that may require NRC licensing. As an independent safety and security regulator, the NRC is responsible for ensuring that spent nuclear fuel is managed safely and securely. Consistent with its role as an independent regulator, the NRC will continue to support the national program for spent nuclear fuel, including reviewing applications for any new technologies related to the processing and disposition of the nation's spent nuclear fuel.

United States Senate
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
WASHINGTON, DC 20510-6175

March 2, 2020

The Honorable Kristine Svinicki
Chairman
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Dear Chairman Svinicki,

We support the Nuclear Regulatory Commission's (NRC) efforts to assess and modernize the Reactor Oversight Process (ROP), known as the ROP Enhancement Initiative. This initiative will result in an improved method to oversee our nation's nuclear power reactors.

America's nuclear plants provide clean, reliable energy that powers our economy. These reactors dependably generate carbon-free electricity over 90 percent of the time. They are performing at historically high levels of safety and efficiency.[1] As the nation's largest source of carbon-free energy, the continued safe and affordable operation of our nuclear power plants is critical to protecting the environment. The ROP Enhancement Initiative will help to achieve this goal by modernizing the ROP that has effectively contributed to safe nuclear power operations for the past 20 years.

The Atomic Energy Act requires a "reasonable assurance of adequate protection" to protect public health and the environment.[2] Building on the foundation set by the Atomic Energy Commission, the NRC's 45 years of experience meeting this requirement is the cornerstone of our nation's strong legacy of nuclear safety. Nuclear power plant operators have also gained great experience since the launch of commercial nuclear power. This leads to increased performance and safety. With the regulator and operator's extensive experience, as well as improved data collection methods, it is appropriate for the Commission to take a fresh look at your regulatory processes. We applaud the NRC staff for initiating a review of the ROP in 2018.

Congress also supported modernizing nuclear energy regulation with the overwhelmingly bipartisan passage of the Nuclear Energy Innovation and Modernization Act (NEIMA), which President Trump signed into law on January 14, 2019. NEIMA endorses the NRC's longstanding policy of integrating risk and performance information into regulatory decisions.[3] The NRC's

---

[1] United States. Cong. Senate. Committee on Environment and Public Works. *Hearing on Preserving and Expanding Clean, Reliable Nuclear Power: U.S. Commercial Nuclear Reactor Performance Trends and Safety Initiatives. November 13, 2019.* 116th Cong. 1st sess. Washington: GPO, 2019 (statement of Robert F. Willard, President and Chief Executive Officer, Institute of Nuclear Power Operations.
[2] Atomic Energy Act of 1954, as amended (P.L. 83-703)
[3] https://adamswebsearch2.nrc.gov/webSearch2/main.jsp?AccessionNumber=ML19319C832

ROP Enhancement Initiative will more fully incorporate the risk-informed, performance-based approach into the ROP process.

On June 28, 2019, the NRC staff provided its ROP Enhancement Initiative proposal to the Commission.[4] The staff "concluded that there has been an improvement in plant safety over the [20 year] period" based on an analysis of multiple safety indicators.[5] The proposal contains modest recommendations based on careful consideration of feedback received throughout the process.[6] This quantitative analysis of data and historical trends supports the staff's recommendations that prioritize attention and resources on the most safety significant issues.[7] The recommendations would incentivize nuclear operators to expeditiously address safety issues.

Openness is one of the NRC's Principles of Good Regulation.[8] We appreciate the staff's commitment to this principle in the development of the ROP Enhancement Initiative. The 21 public meetings held to date to discuss aspects of the ROP Enhancement Initiative are evidence of NRC's robust public outreach and engagement. Additionally, on August 7, 2019, the NRC staff announced a 60-day comment period to receive public feedback on the staff's recommendations.[9] The public submitted 89 comments.[10] The NRC also maintains a website to provide frequent updates on the initiative.[11] This robust public engagement is critical to successfully developing and implementing the ROP Enhancement Initiative.

A hallmark of a strong nuclear safety culture is a questioning attitude, one that continually challenges the status quo in pursuit of safe, secure, and efficient operation of the nation's nuclear power plants. Ensuring the programs and processes at the heart of nuclear safety regulation continue to evolve and keep pace with innovation and technological improvement is essential to maintaining a strong internal safety culture at NRC.

We request you act on the NRC staff's recommendations for near-term ROP improvements. We also encourage you and the NRC staff to consider additional actions in the second phase of the initiative. We believe this process will result in further steps to prioritize resources on areas of greatest safety significance.

We appreciate the Commission's support for reassessing and improving the Reactor Oversight Process. This demonstrates that the NRC is a learning organization with regulations based on performance and informed by risk. We look forward to your ongoing consideration of this effort.

---

[4] United States Nuclear Regulatory Commission, *Recommendations for Enhancing the Reactor Oversight Process* (SECY-19-0067, June 2019)

[5] Ibid.

[6] Ibid.

[7] On February 7, 2020, the NRC staff proposed a revised process to resolve issues of "very low safety significance." This proposal, which originated as part of the ROP Enhancement Initiative, will assure that both NRC and licensees help prioritize focus on addressing safety issues. See: https://www.nrc.gov/docs/ML2002/ML20022A032.pdf

[8] NRC's Principles of Good Regulation are: Independence, Openness, Efficiency, Clarity, and Reliability.

[9] https://www.federalregister.gov/documents/2019/08/07/2019-16876/reactor-oversight-process-enhancement-initiative

[10] https://www.nrc.gov/docs/ML1931/ML19312B408.pdf

[11] https://www.nrc.gov/reactors/operating/oversight/rop-enhancement.html

Sincerely,

John Barrasso, M.D.
Chairman

Shelley Moore Capito
United States Senator

Mike Braun
United States Senator

John Boozman
United States Senator

James M. Inhofe
United States Senator

Kevin Cramer
United States Senator

M. Michael Rounds
United States Senator

Roger F. Wicker
United States Senator

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

CHAIRMAN

February 24, 2020

MEMORANDUM TO: Margaret M. Doane
Executive Director for Operations

FROM: Kristine L. Svinicki

SUBJECT: CONCERNS PERTAINING TO GAS TRANSMISSION LINES AT THE INDIAN POINT NUCLEAR POWER PLANT

The U.S. Nuclear Regulatory Commission (NRC) Office of the Inspector General (OIG) recently provided me its Event Inquiry, "Concerns Pertaining to Gas Transmission Lines at the Indian Point Nuclear Power Plant" (Case No. 16-024). In that report the OIG raises concerns regarding (1) the NRC's safety analysis that supported the Federal Energy Regulatory Commission's determination to approve modifications to gas pipelines at Indian Point and (2) the NRC's response to a petition filed under 10 C.F.R. § 2.206 on this topic.

I direct that the NRC staff promptly examine whether any immediate regulatory action is needed based on information in the OIG report and promptly inform the Commission of the results of that examination and what actions, if any, the staff plans to take. If the staff determines that no immediate regulatory action is warranted, the staff should provide the Commission with the staff's basis for that conclusion. In addition to the staff's prompt examination of the need for immediate action, the staff should undertake a review of whether any information in the OIG report demonstrates that the staff should revisit either the safety analysis or its response to the section 2.206 petition. The staff should also evaluate whether any modifications to agency practice or procedures are needed or appropriate based on the OIG report. Finally, the staff should provide the Commission with the results of this review within 45 days of the date of this memorandum.

cc: Commissioner Baran
Commissioner Caputo
Commissioner Wright
A. Vietti-Cook, SECY
M. Zobler, OGC
D. Lee, OIG

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 26, 2020

MEMORANDUM TO: Chairman Svinicki
Commissioner Baran
Commissioner Caputo
Commissioner Wright

FROM: Margaret M. Doane
Executive Director for Operations

SUBJECT: CONCERNS PERTAINING TO GAS TRANSMISSION LINES AT THE INDIAN POINT NUCLEAR POWER PLANT: DETERMINATION NOT TO TAKE IMMEDIATE ACTION

This memorandum responds to the Chairman's February 24, 2020, direction to the Executive Director for Operations (EDO) to address matters raised in the Nuclear Regulatory Commission (NRC) Office of the Inspector General (OIG) report, Event Inquiry, "Concerns Pertaining to Gas Transmission Lines at the Indian Point Nuclear Power Plant" (Case No. 16-024). In that memorandum, the Chairman directed the prompt examination to determine if immediate regulatory action is needed based on information in the OIG report and to promptly inform the Commission of the results of that examination and what actions, if any, the staff plans to take. For the following reasons, I have determined that there is no need for immediate regulatory action.

In response to the Chairman's direction, I tasked Dr. Mirela Gavrilas to examine the information in the OIG report (advance copy) and evaluate promptly whether immediate action is warranted. Dr. Gavrilas was not involved in the matter in question in the OIG report. Dr. Gavrilas received her Ph.D. in nuclear engineering from the Massachusetts Institute of Technology and has decades of experience in nuclear power plant safety.

The determination on whether immediate action is needed was performed in accordance with the agency procedure used to respond to nuclear power plant emergent issues. This procedure is found in section 4.2.1 of LIC-504 Rev. 4 "Integrated Risk-Informed Decision-Making Process for Emergent Issues" (Agencywide Documents Access and Management System Accession No.: ML14035A143). After reviewing the findings in the OIG report and the technical aspects of the 42-inch gas line that traverses the Indian Point Energy Center property (IPEC), Dr. Gavrilas has determined that there is no safety issue warranting immediate regulatory action at either Unit 2 or Unit 3.

This conclusion is based on the following summary findings that are explained in more detail in the attached enclosure:

- There is no significant degradation to defense-in-depth at either unit.
- There is no significant loss of safety margin at either unit.
- There is no high-risk impact at either unit from internal or external events, as all risk metrics are under the prescribed thresholds.

I have assigned David Skeen to lead a team of experts to respond to the remaining issues in the Chairman's memorandum, including the direction to provide the Commission with the results of a staff review within 45 days of the date of the memorandum. Mr. Skeen has been a member of the Senior Executive Service for more than a decade, and previously served as the director of the Japan Lessons-Learned Directorate. In that capacity, he had a key role in evaluating the safety of the U.S. nuclear power plant fleet in response to the events at the Fukushima Daiichi nuclear power plant caused by the Great Tōhoku earthquake and tsunami. Mr. Skeen was not involved in the matters addressed in the OIG report.

As is contemplated under the procedure, LIC-504, during the course of the team's review, the team will be mindful of the need to assess any new emergent issues.

Enclosure:
Evaluation of Emergent Information
Pertaining to Gas Transmission Lines
at the Indian Point Nuclear Power Plant

cc: SECY
OGC
OIG
OPA✓
D. Skeen

Evaluation of Emergent Information Pertaining to
Gas Transmission Lines at the Indian Point Nuclear Power Plant

This evaluation is in response to the Chairman's tasking of February 24, 2020, to determine if immediate regulatory action is necessary. This prompt evaluation was performed in accordance with Section 4.21 of Office of Nuclear Reactor Regulation (NRR) office instruction LIC-504 Rev. 4 "Integrated Risk-Informed Decision-Making Process for Emergent Issues" (Agencywide Documents Access and Management System (ADAMS) Accession No.: ML14035A143) within 24 hours of the request.

Defense-in-Depth

LIC-504 states that additional regulatory action may be required to place or maintain the plant in a safe condition if defense-in-depth is significantly degraded (e.g., multiple barriers are moderately to significantly degraded, functional redundancy or diversity is significantly compromised, or vulnerability to single failures is significantly increased).

While a pipe rupture could impact certain structures on the site (e.g., gas turbine fuel oil tanks, the switchyard, emergency operations facility, FLEX equipment storage building), the pipeline is located approximately 1500 ft (rev 2) from the nearest safety related structure and barriers to radioactive release (i.e., the fuel cladding, reactor coolant system pressure boundary, and containment) would be maintained. Impacts to nearby structures could affect the plant response measures or the probability of additional initiators. However, there are still multiple diverse barriers and mitigation measures in place to minimize the challenges to the plant, preventing events from progressing to core damage, containing the radioactive source term, and ensuring emergency preparedness capabilities. Impacts on structures in the proximity of the explosion do not significantly degrade defense in depth.

Safety Margins

LIC-504 states that additional regulatory action may be required to place or maintain the plant in a safe condition if there is significant loss of safety margin (e.g., the calculated ASME code structural factors for a component are equal to or less than 1). Regulatory Guide 1.174 also indicates that safety margins are adequate if (1) the codes and standards or their alternatives approved for use by the NRC are met and (2) licensing basis safety analysis acceptance criteria are met.

A pipe rupture does not affect the plant's compliance with codes and standards. Compliance with the plant's technical specifications ensures adequate margin is maintained against design basis accidents.

Risk Assessment

Assumptions and Inputs:

Appendix F in the Federal Emergency Management Agency (FEMA) "Handbook of Chemical Hazard Analysis Procedures" 1989-626-095-10575, 1989 (ref 1) identifies accident rates for pipelines with a diameter greater than 20 inches at 5E-4 accidents per year per pipeline mile. The FEMA Handbook also states that only 20% of events constitute large pipe ruptures.

Based on this probability, the frequency of pipeline rupture is calculated assuming 3935 ft of pipeline are near the site. This is equal to (3935 ft / (5280 ft / mi)) = 0.745 mi of pipeline (ref 2). The frequency of pipeline ruptures is therefore:

$$\text{Frequency of pipeline rupture} = \text{Failure rate} * \text{rupture percentage of failures} * \text{pipeline length}$$

$$\text{Frequency of pipeline rupture} = (5 * 10^{-4} \text{ failures/year/pipeline mile})(0.2 \text{ complete ruptures/failure})(0.745 \text{ pipeline miles})$$

$$\text{Frequency of pipeline rupture} = 7.45 * 10^{-5}$$

The values of risk to be compared against the risk action thresholds provided in LIC-504 are calculated by making three conservative assumptions:

- All complete ruptures lead directly to core damage.
- The "as-is" condition exists for 45 days (the duration of the Chairman's tasking memo).
- Large early release probability is 0.1 of the core damage probability.

Under these assumptions:

- The conditional core damage frequency (CCDF) can be calculated as the frequency of a pipeline ruptures times the probability that a pipeline rupture leads to core damage, or:
$$(7.45 * 10^{-5}) * (1) = 7.45 * 10^{-5}$$
- The conditional large early release frequency (CLERF) is calculated as 0.1 of the conditional core damage probability or:
$$(7.45 * 10^{-5}) * (0.1) = 7.45 * 10^{-6}$$
- The incremental conditional core damage probability (ICCDP) in the 45-day window can be calculated by multiplying the conditional core damage probability, the initiating event frequency, and the duration of the condition, or:
$$(1) * (7.45 * 10^{-5} \text{ events/year}) * (45 \text{ days}/365 \text{ days/year}) = 9.18 * 10^{-6}$$
- The incremental large early release probability (ICLERP) can be calculated as 0.1 of the incremental conditional core damage probability, or:
$$(9.18 * 10^{-6}) * (0.1) = 9.18 * 10^{-7}$$

These values can be compared against the risk action thresholds in LIC-504:

Parameter	LIC-504 Risk Action Threshold	Calculated Value
CCDF	1E-3	7.45E-5*
CLERF	1E-4	7.45E-6
ICCDP	5E-5	9.18E-6
ICLERP	5E-6	9.18E-7

Discussion:

The numbers provided above represent median estimates of the conditional core damage probability and large early release probability. However, they were calculated assuming various conservatisms, some of which are enumerated in the table below.

Source of Conservatism	Effect
Large pipe ruptures lead to deflagrations or detonations. The FEMA Handbook notes that "in the event that there is a failure in a pipeline, most often the outcome is a small leak."	1 order of magnitude
Assumptions on pipeline failure rates were structured around studies performed in the 1980s. Since then, codes and standards have improved and probabilities of failure would be less than those assumed. The probability of failure for this specific section of pipeline is reduced since it was constructed to specifications that exceed current code requirements and was covered with concrete planks to prevent inadvertent damage from digging.	1 order of magnitude (or greater)
The analysis assumes that pipeline failures lead directly to core damage. In reality, a pipeline explosion would not directly cause damage to the reactor core, though it could damage safety-related equipment that may be needed to prevent core damage if another initiating event were to occur at the same time.	3 orders of magnitude (or greater)

Thus, the calculated values for CCDF of 7.45E-5, CLERF of 7.45E-6, ICCDP of 9.18E-6, and ICLERP of 9.18E-7 represent upper bound estimates, and there are several orders of magnitude of conservatism separating these values from more realistic estimates.

Conclusions

No significant degradation of defense in depth nor loss of safety margins were identified. The evaluation above shows that the CCDF, CLERF, ICCDP, and ICLERP values associated with pipeline explosions at IPEC are smaller than the LIC-504 risk action thresholds. Therefore, no immediate regulatory action is required to maintain the plant in a safe condition.

* Note that this is a conservatively bounding value for a station blackout initiated by a pipeline explosion because it does not account for various factors, such as the limited line of sight between the explosion and the diesel generator buildings.

References

1. Safety Evaluation Performed by Entergy Under 10 CFR 50.59 (ADAMS Accession No. ML14253A339), August 21, 2014
2. FEMA "Handbook of Chemical Hazard Analysis Procedures," Appendix F, 1989-626-095-10575, 1989

Your Rights under the Energy Reorganization Act

The Energy Reorganization Act (ERA), makes it illegal to discharge or otherwise retaliate against an employee because the employee or any person acting at an employee's request engages in protected activity.

Employers covered by the ERA are:

•The Nuclear Regulatory Commission (NRC)
•A contractor or subcontractor of the NRC
•A licensee of the NRC or an agreement State, and the licensee's contractors and subcontractors
•An applicant for a license, and the applicant's contractors and subcontractors
•The Department of Energy (DOE)
•A contractor or subcontractor of the DOE under the Atomic Energy Act (AEA)

You are engaged in protected activity when you:

•Notify your employer of an alleged violation of the ERA or the AEA
•Refuse to engage in any practice made unlawful by the ERA or the AEA
•Testify before Congress or at any Federal or State proceeding regarding any provision or proposed provision of the ERA or the AEA
•Commence or cause to be commenced a proceeding under the ERA, or a proceeding for the administration or enforcement of any requirement imposed under the ERA
•Testify or are about to testify in any such proceeding
•Assist or participate in such a proceeding or in any other action to carry out the purposes of the ERA or the AEA

Employers may not retaliate against you for engaging in protected activity by:

•Intimidating
•Threatening
•Restraining
•Coercing
•Blacklisting
•Firing
•or in any other manner retaliating against you

Filing a complaint: You may file a complaint within 180 days of the retaliatory action. A complaint may be filed orally or in writing. If you are not able to file the complaint in English, OSHA will accept the complaint in any language. The date of the postmark, facsimile transmittal, e-mail communication, telephone call, handdelivery, delivery to a third-party commercial carrier, or in-person filing at an OSHA office will be considered the date of filing. The complaint may be filed at or sent to the nearest local office of the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, or the Office of the Assistant Secretary, OSHA, U.S. Department of Labor, Washington, DC. 20210.

If DOL has not issued a final decision within 1 year of the filing of the complaint, you have the right to file the complaint in district court for de novo review, so long as the delay is not due to your bad faith. For additional information: Contact OSHA (listed in tele-

phone directories), or see the agency's website at: www.whistleblowers.gov.

Employers are required to display this poster where employees can readily see it.

Senator BARRASSO. Let me turn to Chairman Svinicki on another report. In 2018, I asked the Government Accountability Office to review and report on changes in the commission's planning, budgeting, and financial management activities. The report was released just this morning. It recommends the commission improve its communications with licensees and clearly define licensing costs. This is going to increase predictability and transparency.

Can you talk about how the commission is increasing the transparency on the regulatory costs for your licensees?

Ms. SVINICKI. Thank you for the question, Chairman Barrasso. I know that the committee had our Executive Director for Operations and our Chief Financial Officer before the committee in January on these topics, so I will attempt to be very brief.

I would reflect that in the 12 years I have served on this commission, it is a step change in sophistication in our budgeting and execution. There are still opportunities for us to continue to improve, particularly on transparency in the regulatory fee, the generation, the calculation of the fees, the invoicing that we are required to do to regulated entities.

I think that the electronic billing system that has been implemented is a noteworthy improvement in their ability to receive and pay invoices electronically to have greater information, more detail on the charges being assessed. It is a journey; we are continuing to look at some of our legacy financial systems as many government agencies are. But I would say that this is a priority for the agency and we are working hard on it.

Senator BARRASSO. Thank you.

Commissioner Caputo, last week the commission unanimously approved a staff proposal to revise the Oversight Program for the new reactor under construction at the Vogtle Georgia Site. The revisions recognize the reduced risk of newer nuclear technologies.

How do you recognize and incorporate changes in risk into your overall commission's Reactor Oversight Program?

Ms. CAPUTO. Well, I think that largely is a testament to the quality of the staff's work in reviewing the reactor technology, how it is going to be implemented, the programs that the licensee is putting in place. It reflects the advances in the technology, the use of passive safety and the lower risk profile.

So in considering how oversight would be different and reflect that lower risk profile, I think the staff has put together a forward-looking approach that is risk-informed and performance-based and reflects that innovation.

Senator BARRASSO. Chairman Svinicki, the Nuclear Energy Innovation and Modernization Act limits how much the commission can request to pay for overhead costs, such as office space and human resource management. The limits were established to ensure funding is primarily used to help the agency meet its mission. The funding is capped at 30 percent in 2021.

The commission's 2021 request for these activities exceeds these limits. How will the commission reduce these costs to ensure compliance with the new law?

Ms. SVINICKI. As I noted in my oral remarks, I am disappointed to sit before you and not have achieved that 30 percent target. I can just communicate to the sincerity of every member of this commission to look for ways to meet the 30 percent without needing to invoke to the extent practicable.

The simplest way I can put it is, when we looked at what it would take to do that, there are things that, if you can invest something now, you can have future efficiencies and savings.

What I would represent to you is the budget before the Congress now, we sought to balance the kinds of things to keep NRC prepared for the future. The investments are needed. We were very close to the 30 percent target. I know close isn't meeting the target, but it was a little over 30 percent, and I own that, and assess that. We did try.

I think our commitment to continuing to look for efficiencies as the NEIMA targets continue to be in place in the coming years will be a very sincere and searching look for continued efficiencies.

Senator BARRASSO. Last year, I requested that the commission consider developing a generic environmental impact statement for advanced nuclear reactors. Developing this environmental document could increase some predictability, could reduce costs, could decrease permitting time for nuclear innovators.

What is the current status of that review?

Ms. SVINICKI. Just this week, the NRC staff submitted a report or paper to the commission that indicated it is the NRC staff's intention to move forward on a generic EIS for advanced reactor technologies. They have tried to assess how much of an efficiency gain, they think maybe about 25 percent of work, overlapping work with the different advanced reactor technologies could be addressed, but they do intend to proceed. So they have informed the commission that they are going to continue to move forward on that.

Senator BARRASSO. My final question before I turn to Senator Carper, and there is a roll call vote going on, so some members may be coming and going to have an opportunity to get to the floor to vote.

In 2017, I asked the Nuclear Regulatory Commission and the Environmental Protection Agency to sign a memorandum of understanding to address some of the jurisdictional concerns regarding the regulation of uranium production. The memorandum will increase predictability for America's uranium producers.

Will you work with the EPA to complete this memorandum?

Ms. SVINICKI. Yes, and the status of that is that it is currently now at its final level of review with the EPA Administrator. And in the case of our commission structure, it is with the commission as a whole to authorize my signature.

Senator BARRASSO. Thank you, Madam Chairman.

Senator CARPER.

Senator CARPER. Thanks. Let me just ask a question of our colleagues here. Do any of you need to leave right away? I can wait, hold off on my questions. No? Are you good? All right.

Again, welcome. It is great to see all of you.

First question I have would be of Commissioner Baran, dealing with the Reactor Oversight Process. Commissioner Baran, can you just give us an update on the proposal to make changes to the Reactor Oversight Process, and provide any further details on concerns you might have with possible changes? Go ahead, and then I have a followup to that.

Mr. BARAN. Sure. Well, as I mentioned in my opening statement, we have had the Reactor Oversight Process for 20 years now, and it has never been a static process. It is going to change.

To me, I think the test that was when we are considering changes, is it something that is going to improve the process, increase safety, or is it something we are doing just to save money. I am very concerned about a lot of the proposals to reduce inspections in order to save money. I think that is the wrong approach. I think we need, if we are going to look at an inspection change, it should be a strong safety case for that. We should be looking at operating experience, inspection experience, and make sure we are really thinking through.

It has been an effective program. We don't want to cause unintended consequences. We don't want to break something that is largely working well, and we don't want to weaken oversight. That is my approach to it.

Senator CARPER. All right. The followup, if I can, as you know we have multiple nuclear reactors that are closing, and as a result, additional spent fuel going into dry cask storage. Earlier this year, I expressed concerns to NRC's staff about proposals to reduce dry cask storage inspections.

Could you just give us an update on that issue please?

Mr. BARAN. Sure. Well, the NRC staff is actively considering major reductions in NRC's safety inspections for dry cask storage installations. One proposal being discussed would cut dry cask storage loading inspections by 47 percent. Another proposal would cut dry cask storage installation routine monitoring by a third.

There is a lot going on right now that has the agency, the industry, and the public focused on the safety of dry cask storage. We have nuclear power plants decommissioning, as you mentioned. There is increased interest in consolidating interim storage.

There was a near drop of a dry cask at San Onofre in California. I don't think it makes sense to consider deep cuts to NRC's modest inspection program in this area. Slashing inspections would not enhance safety. It would just reduce public confidence in the safety of this method of storage, and I think heighten the safety concerns of dozens of host communities across the Country.

Senator CARPER. All right, thank you.

Chairman Svinicki, if I could ask a question of you, and maybe I will ask one or two of the others commissioners to comment too. I will just direct the question initially to you.

Do you believe the NRC will have the resources needed in the long run to continue to do its job effectively? If the NRC does not have the needed funding, are the tools in the law adequate to ensure that the NRC is able to inform us in Congress that additional funding is needed?

Ms. SVINICKI. Thank you for that question.

Senator CARPER. You are welcome.

[Laughter.]

Ms. SVINICKI. Again, as we continue to engage this committee and other committees of the Congress on our budget as the years progress, I am confident that there is a shared goal to prepare NRC for the future and to maintain the safety of current nuclear facilities in the United States. I would hope that based in that common ground, there would be support for NRC and the resources it needs going forward.

I think the human, the people question, is something that has dependencies outside of NRC. By that, I mean we have got to get young people interested in this technology. There are more people going into the study of nuclear science. That encourages me.

But when they think about some of the planning for the deployment of advanced nuclear technologies, I don't see a corresponding elevation in people entering the pipeline who would be designing and licensing and running those plants in the future. That is probably my principal concern, is the human capital challenge in the nuclear enterprise, as a whole.

Senator CARPER. All right. Just very briefly, do any other commissioners want to comment just very briefly on that question? Commissioner Caputo?

Ms. CAPUTO. I would like to support what the chairman said on that topic. Largely, the human capital challenge for us as an agency is partly driven by the need to attract young people, and also to maintain and develop our mid-level managers as well to prepare to take over for this large body of experts that we have that are nearing the end of their career.

So I think the juggling of our ability to really benefit from the expertise of the more experienced portion of our work force, but juggle the incoming new expertise and make sure that we have our skills where we need them at the right time, I think, is one of the biggest challenges facing the agency.

Senator CARPER. OK, thanks. On April 4th, that is a Saturday, in the Port of Wilmington in Wilmington, Delaware, the most modern fast-attack nuclear submarine on the planet will be commissioned, the U.S.S. Delaware. It has been a labor of love for 7 years to get us to that day.

One of the things we are doing is partnering with the Department of Education and many schools in our States to connect schools, students, to our submarine and the crew and to have a chance to tour the submarine and find out about nuclear energy, find out how do you go to sea for 90 days and be submerged and have air to breathe and water to drink, and find your way under the polar ice caps.

So the idea there is to pique their curiosity and their interest, and hopefully they will provide some incentive and encouragement for youngsters, young men and women, to consider nuclear energy as a career going forward.

Thank you.

Senator BRAUN.

[Presiding] Senator Rounds.

Senator ROUNDS. Thank you, Mr. Chairman. I have a couple of questions on the budget. But I think rather than getting into budg-

et issues, I would like to give you all an opportunity to talk a little bit about the future of energy policy in the United States with regard to nuclear energy.

What I would like to start with is this. We are going to lose three more nuclear power plants in the coming year. Clearly, it is a baseline source for power. As new renewables come online, there is still a need for a baseline of power.

Can you share with me what you think the greatest risk is to the future for nuclear power to be a part of that baseline power source for this Country for years to come?

And I would just like to go right down the row. Madam Chair.

Ms. SVINICKI. Thank you, Senator.

In addition to kind of the human resource and human capital challenge that we mentioned, just nuclear enterprise-wide, there would need to be substantially, I think, enhanced numbers of people entering the nuclear sciences and professions, and also some of the supporting capacities.

I know that our colleagues at the Federal Energy Regulatory Commission have the tough work of looking at market structures for electricity in the United States. I think that my assessment is, that market system has more to do with some of these decisions to cease operating earlier, more so than any of the nuclear safety matters that we are involved in.

And I think longer term, the answer is, NRC will need to have the kind of adaptable systems to a much more broad scope of nuclear reactor technology. Building that capacity takes work, takes investment. We are doing our best on it.

There is a term, watchful waiting, but I would say what we are doing is watchful preparing. As technologies are developing, we are trying to be as agile to be ready to review that technology. But it is not perfect, and we don't want to overinvest in technologies that don't make it to the development finish line.

So we have a lot of things to balance, and it is a bit of a footrace. Thank you.

Senator ROUNDS. Thank you. Commissioner Baran?

Mr. BARAN. I agree with the chairman, that it is largely a question of economics in terms of the existing fleet, which isn't really in NRC's area, but I think that is true.

I think, what can we as an agency do, what is within our mission, I think it is having an effective licensing process, to the extent that as the chairman mentioned, there are new technologies that are interested in submitting applications.

We need to be ready for that, and it is a challenge because there are, as many of you know who have been following non-light water reactors, a lot of vendors out there with a lot of very different technologies. It is really going to be on us to be ready for all the different technologies that could come through the door.

And so that is a big challenge for us. It has been an area where we have been, over the last few years, very focused, and that is the part of this question that really is within NRC's jurisdiction.

Senator ROUNDS. Commissioner Caputo.

Ms. CAPUTO. I think one of the most important things that we do every day, particularly through our ever-so-dedicated work force, is to maintain that safety focus on the existing fleet, to make sure

that our regulations and our regulatory reviews are predictable and effective. Because many times licensees would prefer a predictable decision to an expeditious one.

So it is incumbent upon us to do our homework and be thorough, but to make sure that we are giving them efficient decisionmaking that allows them to continue.

Part of that, I believe, is embracing modern technology. The use of digital instrumentation control has been a particular challenge for this agency, but it is also one that is fairly important for the future of the existing fleet. So I think it is important for us to wrestle with that technology and reach a decision so that the industry can feel free to implement the safety benefits and efficiency that they would see from that technology.

Senator ROUNDS. Thank you. Commissioner Wright?

Mr. WRIGHT. Thank you for the question.

Being No. 4, a lot of the stuff has already been covered. But I do agree with the chairman and my fellow commissioners about human resources. We need to have proper people who are trained and educated and I would hope have a passion for what they are trying to get into in the nuclear field.

Market conditions are obviously something that we can't control. We are safety regulators, so we want to make sure that we are not a barrier to new technologies getting to market. Because I do think personally that there is a national security implication here. So we need to be sure that we are nimble enough to be able to adjust to whatever technologies are coming before us to be licensed and to regulate them safely.

Senator ROUNDS. Thank you. Thank you, Mr. Chairman.

Senator BRAUN. Senator Whitehouse.

Senator WHITEHOUSE. Thank you, Chairman.

Welcome, everyone. Glad to have you here. As you know, the Congress on a very bipartisan basis is giving you some very significant new responsibilities and authorities and some very significant new resources. I count $230 million for the new Advanced Reactor Demonstration Program, $20 million for the Nuclear Reactor Innovation Center, $65 million to support materials testing, $15 million for you guys, to support your reorganization to adapt to the new technologies and so forth.

A, I hope you are excited by that. B, I hope you are aware that this bipartisanship is not the constant posture of Congress, and you should take advantage of it. And C, one of the motivating factors for some of us in supporting these new bills and supporting this new spending is that these new technologies hold the promise, at least, of re-purposing our nuclear waste stockpile, which now has no real plan. If you think Nevada is a plan, anything that is been the plan for 30 years isn't the plan. So we have no real plan.

The ability to re-purpose this, I think, is incredibly valuable, and it creates a very important public purpose to what you are doing. So I hope very much that in all of your decisionmaking, you are keeping in mind the importance of that solution.

This is not just a question of getting new reactors running. This is not just a question of producing carbon-free power. This is also a very important question of seeking technological advancements that will give us a way to address our nuclear waste stockpile.

If we were a company, that nuclear waste stockpile, if we were in Senator Braun's company, that nuclear waste stockpile would be a big fat liability sitting on his books. And every year his accountants would come in and say, what the hell are you going to do about this, because we are going to have to report this big, fat liability sitting on your books.

Because the U.S. doesn't account that way, it sits there more or less free, and that really diminishes our incentive in Congress to address the problem. This is about all we have got, so please don't let us down on that.

Can I ask for your reaction to that statement?

Ms. SVINICKI. Senator Whitehouse, the bipartisan investment that Congress has been making in advanced nuclear technologies is, as you know, kind of unprecedented in my years working in and around this issue.

Senator WHITEHOUSE. So don't blow it.

Ms. SVINICKI. NRC's commitment is to show up as an informed, a regulator, but a very informed participant as test plans are being designed. In order to have that investment yield the information we need to make regulatory decisions. Realizing that Congress has been clear with me publicly and privately, we are not investing twice so NRC can do this work over, so you have to show up and participate with the Department of Energy, with the national laboratories when these investments are being designed, will you derive from the investment the information, the testing data, the things that NRC is going to need, and our people are excited about it.

I appreciate your mentioning that. It is new things; it excites the work force, and they are participating, whether it be with the Pentagon on micro-reactors, or the Department of Energy and engagements on the versatile test reactor. I have had DOE counterparts express to me that in their observation, this is the most constructive collaborative working relationship we have had between NRC and DOE in recent years.

Senator WHITEHOUSE. And in all of that, you did not mention restructuring or re-using the nuclear waste stockpile as a goal or a purpose or a function that helps to put on your priority list.

Ms. SVINICKI. And let me say I am sorry.

Yes. I am aware that there are technology developers that have that as an objective. I was meeting with some innovators from Silicon Valley, and they said, why doesn't the government have a kind of a X-prize or something to really incentivize developers to make that a key design goal. I thought that was intriguing.

Senator WHITEHOUSE. Do you think you would need further legislative authority to make addressing the problem of our nuclear waste stockpile as a potential energy resource a priority for you?

Ms. SVINICKI. No, for the developers and the private investors. If there was some sort of design competition around, how could you make the most success in terms of utilizing the energy value of spent fuel, so they were talking more about the private investment and design.

Senator WHITEHOUSE. You have a fork in the road, and you have a choice between two paths, and one of them will advance the use

of spent fuel as an energy source. All other things being equal, would you lean that way?

Ms. SVINICKI. Well, again, we will review the request for safety reviews that come before——

Senator WHITEHOUSE. All other things being equal, would that be an advantage that you would seek to pursue?

Ms. SVINICKI. Because it would be an advantage for the developer and the marketplace, it is likely that we would make a priority of such a review because it is something that they would be pursuing very vigorously. Again, we don't necessarily prioritize the technologies that get submitted to us.

Senator WHITEHOUSE. I am over my time. If I could get answers from the other witnesses in QFR form, so I am not taking my colleagues' time. Just answer, is the NRC going to make it a priority to look at technologies that convey the collateral advantage of putting an alternative use to what is now a big liability and a big hazard sitting out there, which is our current nuclear waste stockpile? Thank you.

Thank you, Chairman.

Senator BARRASSO.

[Presiding] Thank you, Senator Whitehouse. Senator Braun.

Senator BRAUN. Thank you, Mr. Chairman.

You know, like what Senator Whitehouse said, there is a lot of collegiate interest in trying to get this worked out. The two-fer that we get for addressing the nuclear waste issue, along with what is the next act for base load energy generation, I think there is a lot riding on it. I think that everything he said I would echo 100 percent.

So as a CEO and entrepreneur, the rare moments in your span of whatever enterprise you are in, is to make sure you do stick your neck out and take a little risk. And this has nothing to do with mitigating the risk of what nuclear energy is about. It is about the opportunity.

I am the first member to join the Climate Caucus on the Republican side of the aisle. Now there are six others. It is an issue, if you want to emphasize how do we generate electricity, and how do we put let CO2 into the atmosphere, I think it is very important.

You folks, as the kind of regulatory board, I think, have disproportionate, maybe, ability to engender a movement in the direction that he was talking about, where you accomplish two things.

My question would be on, particularly, advanced nuclear technology. In all the things I am looking at, to me, it is probably the closest to being a bird in the hand for baseload production.

I want your opinion with whatever you do that you are setting the stage for us to move as quickly as we can to get that from the laboratory into the field, and start with you Chairman Svinicki, and go down the line.

Ms. SVINICKI. Senator, this is a very active area for the Nuclear Regulatory Commission. I would observe that we are extremely engaged in all dimensions, whether it be with the DOE National Laboratories, with technology developers who come in and want to just talk about our process and how would they submit a design and get it reviewed.

I would characterize that I think that the NRC is very proactive, but we don't know what we don't know. We don't know in terms of the settling out of a field of maybe 50 different reactor technologies.

Economically, there is going to be, not because we cause it, but there will just be a winnowing down of that. And there are going to be designs and fuel cycles that come forward faster than other ones. So we are trying to keep an eye on that and be sure that whichever ones are coming in early versus late, that we are preparing ourselves for those while we continue to look at the rest of the field out there and see what is going to come in behind that.

Mr. BARAN. I agree with everything the Chairman said.

I would just offer maybe a little bit of perspective. I have been on the Commission now 5 years, and this area has really taken off quickly in that time. When I first arrived on the Commission, there was actually very little talk at that point about advanced reactors. It was, you know, there were vendors out there, but there was no real prospect that anyone was coming through the door any time soon.

Within a couple years of being on the Commission, the level of interest among vendors, the Department of Energy, and within NRC, just went through the roof, really. And the level as you have talked about, bipartisanship in Congress, the funding that we have received to start getting ready, a huge amount of work has been done in the last few years. It has really been a pretty remarkable ramping-up, and I think it will continue into the future as we start getting specific vendors coming in with applications.

Ms. CAPUTO. There is a myriad of work that is being done, but one of the things I think that the staff has made considerable progress on is a methodology that will become the basis for a future rulemaking that will be technology-inclusive, risk-informed, and performance-based, as directed in the Nuclear Energy Innovation and Modernization Act. So I think that is a big step forward for the staff. I think it shows a lot of thought, definitely rooted in the history that we have and the operating experience that we have. I am particularly excited about that.

In the meantime, until that rule is completed, these are going to be novel technologies coming forward, and in some ways, they may request novel regulatory approaches to review their licensing. I think there are many ways in which we can prepare, but some of this will have to be done case by case, depending on the nature of what is contained in the applications that get submitted.

Mr. WRIGHT. Thank you for the question, and I do agree with the Chairman and the rest of my colleagues, what they have said.

Again, I am going to just reiterate what I said earlier. We can't be a barrier to these technologies that are coming forward. Obviously, we have to be externally aware of what is happening around the world, globally, and in the marketplace. The market is going to determine it, ultimately, but we cannot be standing in the way. We have got to provide that regulatory path.

Senator BRAUN. Very good. Be nimble, be entrepreneurial.

One quick followup question on our current fleet. I visited one that I was very impressed with in Michigan. Many are at the point

of whether they are going to go for the first extension, possibly the second from 40 years to another 20, and then another 20.

Chairman, if you would comment, my impression of the current nuclear fleet looks like it has learned a lot, they are performing well. Would you encourage that most of them exercise an extension, or what is your feeling there? Because I think that bridges the gap until we get to advanced nuclear technology.

Ms. SVINICKI. Senator, just briefly, the Nuclear Regulatory Commission staff has issued the first of what we call subsequent license renewal. That is the second 20-year extension to the operating license. My understanding is that among operating reactors in the United States, there is strong interest in coming in for further extension. It is an individual business case that they will each decide whether they come in.

Senator BRAUN. That is good. I think that is important to bridge the gap between what I think is the next act in energy generation, advanced nuclear technology. Thank you.

Senator BARRASSO. Thank you, Senator Braun. Senator Duckworth?

Senator DUCKWORTH. Thank you Chairman Barrasso and Ranking Member Carper.

Chairman Svinicki, I have repeatedly raised my concerns with NRC's internal safety culture with you. In the past, when I have raised these issues, you have stated that the commissioners have an open-door policy and have instituted agency-wide training on how to have tough conversations. I appreciate those responses. Yet I do not believe that you have gone far enough in making your work force feel valued.

NRC recently published the results of several internal polls that were administered as part of a staff JAM. Thousands of staff participated, and when asked if NRC needed to change its culture, 82.23 percent agreed that a change is needed. Only 6.76 percent of the staff that responded disagreed that a culture change is needed.

Chairman Svinicki, do you agree that the Commission must take additional steps to improve the workplace atmosphere for NRC employees?

Ms. SVINICKI. Thank you, Senator Duckworth. The JAM was a wonderful opportunity for us to, I think, hear the voices of some employees that maybe wouldn't have participated in other more formal survey or outreach, and so we do take that result very seriously.

I think that there is an element of the expression of changing our culture that has to do with the overall modernization, the new technologies we are confronting. We have, under the Executive Director for Operations, established an initiative with a staff-led team that is looking at agency culture specifically. Their work is ongoing. They are engaging a lot of the agency staff, and I would depict it as kind of not a top-down, but more of a grassroots staff dialog about what should the agency's desired culture be.

So we have work ongoing on that, and more to come that as that group completes its work and makes recommendations, we can engage you and the committee members on that.

Senator DUCKWORTH. I would appreciate it, but it is not just some, it is literally thousands took part in your JAM. So it is not

just a handful of people, it is thousands of your employees. Why did the NRC remove the results of this JAM from the website? It was up for a while; we were able to access it. I would like for you to submit them to committee as they were originally published.

Ms. SVINICKI. I am not aware of that. May I take that for the record and your request, and we will respond to you? I wasn't aware of the status of the JAM results.

Senator DUCKWORTH. All right. It was online, but now it is no longer there, so I would like a copy of the original, as published.

Ms. SVINICKI. Thank you.

Senator DUCKWORTH. Thank you. The staff at NRC have made several asks of leadership, including ensuring follow-through, facilitating teamwork, trusting and supporting staff, stay open to feedback, and be accountable. Will these five things be part of that work group as they are working on culture?

Ms. SVINICKI. I think that the group has taken these JAM indicators and feedback into consideration, but again, it is dynamic. That group is really working hard on this, and I would like to give you kind of what are the basic metrics that they are looking at in that group. I would like to get that for the record for you, just to be more precise.

Senator DUCKWORTH. What are you going to personally do to prioritize these very reasonable requests coming from your work force?

Ms. SVINICKI. I think the commission, to a person, does try to lead by example, but as you have noted, there are thousands of employees, and we ourselves need to model the appropriate agency culture. But it really needs to be designed and driven. The staff needs to tell us, and the feedback you are talking about is their input to what they would like to see in a desired culture.

I have worked other places in government, and I think the NRC's effort to have deliberative decisionmaking with input and participatory decisionmaking is something that is a great focus of the agency. I think that gets to some of the indicators you mentioned, is hearing every voice, getting the differing views out, and having that be part of collaborative decisionmaking at the agency.

Senator DUCKWORTH. While I think it is important for you to send a message to your staff that you support this effort, I would like to hear from the remainder of the commission members. I would like to hear from you as well about the culture and whether or not you think the culture needs to be changed, and do you support these very reasonable requests that came out of the JAM.

Mr. BARAN. Well, I agree with you and with the Chairman that it needs to be a focus for all of us. One of the things I have been heartened by over the last few years, when we do have controversial issues, safety issues that come up before the agency, we are seeing the staff more and more send us papers that include the variety of perspectives within the staff. Because the staff is not one monolithic entity. People have different views about it, and if folks have safety concerns about taking a certain step, we want to hear those, and we are seeing that more and more, people coming forward and building that right into the products that are coming up for decision for us.

I am encouraged by that, but I agree with you, it has to remain a focus. I know the Inspector General is going to be doing a safety culture survey. That will give us an additional update on where we are on this, but I agree with you. That needs to be a main area of focus.

Senator DUCKWORTH. Thank you.

Ms. CAPUTO. I would just support what Commissioner Baran said. We are going to have the upcoming safety culture survey, which I think gets at some of the things that you are focused on. But one of the things that I appreciated most about the Futures Jam was the opportunity for employees to have this forum to present wide-ranging views and to have open discussions about things like our concurrence process, and does it take too long, is it not thorough enough. And to really get a full discussion among their peers where they can all voice an opinion.

So I think there are a lot of lessons that we can learn from just the level of contribution and the enthusiasm that people presented, and sharing those opinions and looking for things that the agency can do better.

Mr. WRIGHT. Thank you, Senator, and I agree with what my colleagues are saying.

But I would like to add from a personal point of view, I believe we have got to model what we are trying to implement. I do walk the halls. I go to offices and cubicles and try to meet people in person where they work. One of the things that I think that does is it recognizes people, it empowers people. It encourages them to come to you and actually take your open-door policy seriously and to share those ideas with you.

Within the agency, we have got the Embark Studio that started. In that area, the people are freely coming in with new ideas and trying to push change, which is going to change our culture in a very good way.

Senator DUCKWORTH. Thank you.

Mr. Chairman, I have a second question I would like to ask the panel to respond in writing, and I also ask unanimous consent to introduce a fact sheet entitled Your Rights Under the Energy Reorganization Act as part of that.

Senator BARRASSO. Without objection.

[The referenced information follows:]

Your Rights under the Energy Reorganization Act

The Energy Reorganization Act (ERA), makes it illegal to discharge or otherwise retaliate against an employee because the employee or any person acting at an employee's request engages in protected activity.

Employers covered by the ERA are:

•The Nuclear Regulatory Commission (NRC)

•A contractor or subcontractor of the NRC

•A licensee of the NRC or an agreement State, and the licensee's contractors and subcontractors

•An applicant for a license, and the applicant's contractors and subcontractors

•The Department of Energy (DOE)

•A contractor or subcontractor of the DOE under the Atomic Energy Act (AEA)

You are engaged in protected activity when you:

•Notify your employer of an alleged violation of the ERA or the AEA
•Refuse to engage in any practice made unlawful by the ERA or the AEA
•Testify before Congress or at any Federal or State proceeding regarding any provision or proposed provision of the ERA or the AEA
•Commence or cause to be commenced a proceeding under the ERA, or a proceeding for the administration or enforcement of any requirement imposed under the ERA
•Testify or are about to testify in any such proceeding
•Assist or participate in such a proceeding or in any other action to carry out the purposes of the ERA or the AEA

Employers may not retaliate against you for engaging in protected activity by:

•Intimidating
•Threatening
•Restraining
•Coercing
•Blacklisting
•Firing
•or in any other manner retaliating against you

Filing a complaint: You may file a complaint within 180 days of the retaliatory action. A complaint may be filed orally or in writing. If you are not able to file the complaint in English, OSHA will accept the complaint in any language. The date of the postmark, facsimile transmittal, e-mail communication, telephone call, handdelivery, delivery to a third-party commercial carrier, or in-person filing at an OSHA office will be considered the date of filing. The complaint may be filed at or sent to the nearest local office of the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor, or the Office of the Assistant Secretary, OSHA, U.S. Department of Labor, Washington, DC. 20210.

If DOL has not issued a final decision within 1 year of the filing of the complaint, you have the right to file the complaint in district court for de novo review, so long as the delay is not due to your bad faith. For additional information: Contact OSHA (listed in telephone directories), or see the agency's website at: www.whistleblowers.gov.

Employers are required to display this poster where employees can readily see it.

Senator DUCKWORTH. Thank you.

Senator BARRASSO. Thank you, Senator Duckworth. Senator Gillibrand.

Senator GILLIBRAND. Chairwoman Svinicki and members of the commission, last week the NRC Inspector General released an extremely troubling report related to the NRC's analysis of the Algonquin Incremental Market Pipeline. The Inspector General's investigation found a number of problems with the NRC's analysis:

improper risk calculations, inaccurate statements, and misguided use of a program to assess the impacts of an explosion that did not produce accurate results.

The Federal Energy Regulatory Commission's approval of the AIM Pipeline used the NRC's analysis for its environmental impact statement and relied heavily on the NRC's expertise for approval of the portion of the project that crossed Indian Point's property.

In 2006, I, along with Senator Schumer, called for an independent review, which was unheeded by the NRC. Those of us who raised concerns at the time were told that the NRC's analysis was conservative, and there was no need for any additional review.

The NRC now has a real credibility problem with the community around Indian Point, and this is an abject failure of your agency's responsibility to ensure that proper analysis was done to evaluate the potential risk posed by the pipeline, regardless of whether there was a direct or immediate impact to plant safety or not.

I am most interested now in what the NRC is going to do to restore its credibility and ensure that this doesn't happen again. I have a number of questions to understand how the NRC intends to address the facts laid out by the Inspector General's report.

First, can you please explain the steps that the NRC will take to reevaluate the safety analysis for the AIM Pipeline and modify agency practices or procedures?

Ms. SVINICKI. Thank you, Senator Gillibrand. Again, I want to just note for you and commit that to a person, this commission, takes this matter, the things identified by the Inspector General are real, they are significant, and very, very important that we address quickly.

Upon receipt of the Inspector General report, on behalf of the commission, I directed the agency's senior career civil servant, the Executive Director for Operations, to do two things immediately. The first was to assess whether or not the issues raised in the Inspector General report should result in immediate regulatory action at Indian Point, and that it needed to be done very, very promptly.

The second item directed at that time was that no longer than 45 days, the Executive Director for Operations needed to task and have a team that looked at exactly the question you posed: what contributed to these gaps and deficiencies in agency's processes, what is the extent, even beyond Indian Point. If the processes were flawed, are there other impacted safety issues that we need to relook at.

And so, your question about the scope of the re-analysis is something that is actively being worked right now. But I think I can confidently State today the NRC expert team acknowledges that there will be re-analysis that will be required. They will also not be doing this—the folks involved in looking at this now did not participate in the prior agency work. Their independence within the agency I think is very, very important to the credibility question you asked.

Also, they have been directed that they will reach outside for expertise, academic or otherwise, perhaps other government agencies that might know about the code and the modeling and its appropriate use.

So I assure you that this has a very, very high priority. I directed that they report in 45 days. The Executive Director for Operations who is here with me today was not content with that. She wants preliminary conclusions in 20 days, so we pledge to keep you and others informed.

Senator GILLIBRAND. So, preliminary conclusions in 20 days, and then when will the review be complete?

Ms. SVINICKI. No later than 45 days at the commission itself.

Senator GILLIBRAND. And will those results be made public?

Ms. SVINICKI. Yes, I commit that I think they need to be.

Senator GILLIBRAND. Will any individuals from outside the NRC be participating in the review?

Ms. SVINICKI. Yes. As I indicated, the team that is directed to do this 20 and 45-day review has been directed to avail themselves of external expertise at other government agencies and academia.

I can't define for you exactly what expertise they are going to decide is needed, so I don't know the shape of that right know. They are still assessing what kind of external expertise they will draw upon.

Senator GILLIBRAND. Will there be any peer review of the review, meaning, is there going to be any outside, independent review of what you are doing now?

Ms. SVINICKI. I can't answer that today, given the formative stage of the team coming together and figuring out the composition of the team and their prioritizing the early priority areas to look at. But I think we will know that soon, and if I could get back to you for the record or in writing on that.

Senator GILLIBRAND. And just for the record, does any other commissioner disagree with what the Chairman has said?

Mr. BARAN. I don't disagree with anything that she said.

I will say this. I think after the NRC's flawed safety analysis, you are right, that many people have lost confidence in NRC, that we will do this the right way. So for a task force to be credible, I think it is important that it be independent, and that means having several task force members from outside the agency, from academia, from other Federal agencies.

In my view, those outside experts should really make up a majority of that task force, and I think we should consult with the State of New York and ask them, who would they recommend for us to have on this panel. Because right now, I think with a lot of stakeholders, we don't have a lot of credibility on this. I think bringing in folks from outside the agency is really going to help with that.

Senator GILLIBRAND. Mr. Chairman, my time is expired, but I do have an additional question. May I ask it, or would you need to——

Senator BARRASSO. Go right ahead, Senator Gillibrand. Go right ahead.

Senator GILLIBRAND. Is that OK with all of you? OK.

Switching gears to Indian Point decommissioning. A number of my colleagues in the New York congressional delegation and I have written to you in support of public hearings on the proposed license transfer from Entergy to Holtec. New York State and a number of other stakeholders have requested a hearing.

Will the NRC hold a public hearing prior to deciding whether to approve the license transfer?

Ms. SVINICKI. Senator, there are, as you note, a number of hearing requests pending, including from the State of New York. It would not be appropriate for the commission to make a commitment that we have a regulatory process for evaluating those hearing requests, and that is underway now, those hearing requests are being evaluated. So, respectfully, I can't make that decision or make that commitment for the commission at the table today.

Senator GILLIBRAND. What would the rationale be if you decided not the have a public hearing?

Ms. SVINICKI. This is where I might turn to my lawyer colleague to help me out here, but under the regulations, there are certain standards against which hearing requests are evaluated. Again, the opportunity for hearing is rooted in the Atomic Energy Act. There is a complex body of precedent and regulatory standards.

As a non-lawyer, I am going to use words like standing and having things that are resolvable within the proceeding, and so it is admissibility of challenges, and I am not a lawyer.

Senator GILLIBRAND. So from a common-sense perspective, not necessarily the legal requirements of your review, it would make common sense to make sure the local community has the ability to have input. Given all the history of Indian Point, given all the disruption that we have seen, given the most recent occurrences, and given the lack of credibility the NRC has, I can't urge you enough to allow the local community to weigh in, so that they are heard, and so that you actually have accessed all the information that might be relevant to this transfer.

I just urge you as a matter of practice regardless of what the legal standard says that it should be the position of you and your commission that local hearings are part of the process. Without it, you have untold problems ahead of you.

Thank you, Mr. Chairman.

Senator BARRASSO. Thank you, Senator Gillibrand.

I would like to point out that the Nuclear Regulatory Commission Inspector General, I believe, is a critical position to detect and to prevent waste and fraud and abuse and mismanagement at the commission. This committee has unanimously supported the current nominee, Robert Feitel, in December. His nomination still awaits floor consideration, so I urge all members of the Senate to support that confirmation quickly.

Senator CARPER.

Senator CARPER. Madam Chair, if I could, maybe another question directed to you. While I was off voting in the Senate, I think a question or two was asked about advanced nuclear. Like a lot of my colleagues, I am also interested in this issue.

I am not going to revisit that issue right at this time, though, because you have already touched on it, but in particular, I am interested in accident tolerant fuel, and I do not know if that is something that been examined and discussed today. But I believe this technology can benefit existing and new technologies.

Can you just provide us with a status update, please, on accident tolerant fuel technologies, and if you have the resources you think you all have the resources to handle the permitting needs of accident tolerant fuels?

Ms. SVINICKI. I benefit from the fact that our commission just held a public meeting on the topic of accident tolerant fuels last week. We heard from panelists who were telling us about their investment and development of these accident tolerant fuels, and then we heard from the NRC staff about a status update.

In brief, much like advanced reactors, there is a kind of continuum of novelty. Some of the accident tolerant fuels are not as different from the current generation fuel, and then there are future accident tolerant fuel concepts that are not as well-developed or not as fully designed yet that I think have the potential for greater safety enhancement, but they are more novel. They have different materials, substantially different designs.

So for the more near-term technologies that the industry may deploy, there are already what we call lead test assemblies that have been inserted at the Hatch Plant, I think is in Georgia, as soon as I was about to say that, I wasn't sure. But there is an operating reactor, so some of those lead test assemblies have now been removed from the reactor. They will soon undergo examination for their materials performance in the reactor.

So I think some of the advanced reactor technologies are a bit in the future. But accident tolerant fuel qualification is happening right now.

Senator CARPER. Thank you. And just in wrapping up, any question you would like to answer that you haven't been asked? Commissioner Wright, anything else, a closing thought to leave us with, please.?

Mr. WRIGHT. Senator, I appreciate the opportunity, as I know my colleagues do as well. We look forward to working very closely with you and the rest of the committee as we move forward with all the new things that are before us, and it is a lot.

It is a lot to keep up with, but I am very excited to have the opportunity to do this. I am excited every day to get up and go to work. I have a great staff. I look forward every day to meeting with our SES staff and the rest of the staff around the agency. It is an amazing place.

Senator CARPER. This was not always the most collegial body, as I am sure the Chairman recalls, and I am glad to see that it has changed.

Just briefly, Commissioner Caputo, anything you want to close with.

Senator BARRASSO. She misses serving on the staff of this committee. I can see it in her eyes.

[Laughter.]

Ms. CAPUTO. Yes, it is not that far in the past yet.

Senator CARPER. You look good on that side of the table.

Ms. CAPUTO. Well, thank you. You look great on that side of the table.

[Laughter.]

Ms. CAPUTO. I think, given that this is a budget hearing, and that we have significant transformation efforts underway, I think one thing that I really look forward to is—being an engineer I am kind of a numbers person. So I do really focus significantly on the budget and our execution.

So I think there is a lot of room for us to harness modern accounting technology and really begin to use information about where we actually spend our money to inform our budget development going forward. I think certainly how we closed out Fiscal Year 2019 with $62 million in carryover shows a lot of room for improvement in terms of better accuracy. I think that is an area that is ripe for improvement.

We recently hired a new Chief Financial Officer, so I have great hope that there are going to be great strides in that area. Thank you.

Senator CARPER. All right, good. Thank you. Commissioner Baran, please?

Mr. BARAN. Just very briefly. I think NRC is going to have an important mission in 2030 and in 2040 and in 2050. The one thing that worries me is our work force, at this point. We have got a great work force right now, but we have about 7 percent attrition each year. We have about 7 percent of the people leaving, and that is a couple hundred.

I worry that we are not doing nearly enough external hiring at this point, both entry level hiring and mid-career, which is not where we need to be. The budget request for 2021 has a new entry level hiring program, 39 people. It is great, but when you are losing 200, I don't think it is nearly enough.

Senator CARPER. Thank you.

Madam Chair, a closing thought, please. Say something brilliant so the other commissioners will say, God, I wish I had said that.

[Laughter.]

Ms. SVINICKI. No pressure, though.

These hearings are a reminder to me of how much we agree on, as a commission. When I joined the commission over 12 years ago, I thought, coming as Senate staff, I wasn't sure how much of my recent experience was going to be called into play day-to-day in serving on a commission like this. I thought I would have to harken back to my nuclear engineering work at DOE, or my education and training.

But the truth is, what continues to be so rewarding about it is that we look for common ground. It is a lot like my experiences in the Senate. As soon as we disagree on something, we have moved on to the next thing where we can find kind of the center of working as a group. The President has nominated an individual who would bring our numbers back up to five.

It is something that the shaping of this, and when I give an answer, and I hear what Commissioner Baran says, and it is like, oh, that is really good, and then we go down the line. That, I think, again, is the wisdom of why Congress created that nuclear safety would be regulated by a commission structure. Because in the push and pull of all those perspectives, and again, we don't agree on everything, but there is so much common ground. And this is true of the four chairmen I have served under, and even in noteworthy days when it wasn't as collegial, there still was a lot of agreement.

I think we safeguard that very, very carefully. That matters to us a lot.

Senator CARPER. That is a good note to close on. Thank you all very much for being here.

Senator BARRASSO. Complimenting the wisdom of Congress, that is a good way to end one of these things. Thank you. Thank you.

Members may submit followup written questions for the record. The hearing record will be open for 2 weeks.

I want to thank the witnesses for your testimony. The hearing is adjourned.

[Whereupon, at 11:22 a.m., the hearing was adjourned.]

○