Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

Title: 33rd Regulatory Information Conference
Technical Session - M2

Docket Number: (n/a)

Location: teleconference

Date: Monday, March 8, 2021

Work Order No.: NRC-1420 Pages 1-50

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NUCLEAR REGULATORY COMMISSION

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33RD REGULATORY INFORMATION CONFERENCE (RIC)

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TECHNICAL SESSION - M2

TRANSFORMATION AND MODERNIZATION OF NRC ENVIRONMENTAL REVIEW PROCESSES: MEETING THE CHALLENGE

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MONDAY,

MARCH 8, 2021

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The Commission met via Video Teleconference, at 10:45 a.m. EST, Peyton Doub, Senior Environmental Scientist, Environmental Review New Reactors Branch, presiding.

PRESENT:

PEYTON DOUB, Senior Environmental Scientist, Environmental Review New Reactors Branch, Division of Rulemaking, Environmental, and Financial Support, NMSS/NRC

JACK CUSHING, Senior Environmental Project Manager, Environmental Review New Reactors Branch, NMSS/NRC

KEN ERWIN, Chief, Environmental Review New Reactors Branch

EDWIN LYMAN, Director of Nuclear Power Safety, Union of Concerned Scientists

KATI AUSTGEN, Senior Project Manager, New Reactors, Nuclear Energy Institute

P R O C E E D I N G S

10:45 a.m.

MR. DOUB: Good morning and welcome to Session M2 of the 2021 RIC. The last five years have been a period of rapid and substantial change in environmental regulation in all agencies in the federal government. And we expect that the next five years may be equally turbulent. Not only has NRC had to transform its environmental review processes to adapt to government-wide changes in environmental policy, but NRC has also had to streamline these processes to meet emerging demands for more efficient nuclear licensing tailored to a new generation of nuclear technologies.

The purpose of this session is to introduce you to how the NRC's environmental review branches are working steadily and creatively to adapt to a rapidly changing regulatory environment. My name is Peyton Doub, and I serve as an environmental scientist with the NRC branch that focuses on environmental reviews for new reactor licensing applications. This session will reflect the work not only of that branch but also of other NRC environmental branches such as those reviewing applications for nuclear reactor license

renewal and for nuclear materials licensing. Next slide, please.

Before our four presentations, I want to give you a brief overview of NRC's ongoing environmental review transformation efforts. First, NRC established an agency-wide Environmental Center of Expertise, or ECOE, bringing in three environmental review branches under unified management. The ECOE is working to standardize the agency's environmental review processes and foster increased collaboration in exchange of innovative ideas and information.

The ECOE has already development a unified environmental review handbook for the agency and a toolbox that compiles under one cover environmental guidance developed by various NRC offices. Other ways the ECOE is transforming NRC environmental reviews are listed on this slide. Some of these actions have been completed such as the environmental review handbook and our development of environmental review guidance for micro-reactors in ISG-29 which was published last year.

Others are ongoing and some are planned. Some will be addressed in the first two session presentations, both by ECOE staff. These include

development of an Advanced Reactor Generic Environmental Impact Statement and multiple efforts that will lead to updated environmental rulemaking. The other efforts shown on the slide are no less important. And while time limitations prevent additional presentations covering them today, any member of NRC's environmental staff would be happy to discuss any of these features individually with you. Next slide, please.

Now I will need to briefly present our panel of speakers. Regarding myself, I am a senior environmental scientist with over 30 years of experience with environmental permitting and the National Environmental Policy Act, especially with respect to ecology, wetlands, and land use. I spent the last 12 years of my career performing environmental reviews for NRC and the previous 20 years reporting similar work as a consultant for various government agencies. I'm a certified environmental professional and professional wetland scientist and have bachelor's and master's degrees in plant biology.

Our first two presentations will be made by NRC environmental staff. The first staff presentation will be by Jack Cushing who will speak

about development of their new Generic Environmental Impact Statement for advanced reactors. We expect that this Generic Environmental Impact Statement will streamline and simplify environmental work with applicants and staff without compromising the agency's environmental responsibilities.

Jack is a senior environmental project manager who is serving as the project manager for developing the Generic Environmental Impact Statement. He has a bachelor's degree in marine engineering and worked as a reactor operator at the Maine Yankee reactor for 13 years before working at the NRC for 22 years. At the NRC, Jack has worked primarily in environmental reviews for license renewals and new reactor licensing.

The second presentation will be by my branch chief, Ken Erwin, who will speak about planning environmental rulemaking efforts. These efforts will update NRC's environmental regulations to adapt to new nuclear technologies and programs. Ken has a master's and bachelor's degrees in nuclear engineering and started his career at the NRC 25 years ago as a technical reviewer of spent nuclear transportation and storage casks. For the last 6 years, Ken has been an environmental branch chief and has developed a deep

appreciation for NEPA and its related laws, policies, and regulations.

The session will then feature two speakers providing perspective from outside entities with an interest in environmental reviews for NRC licensing activities. The first outside speaker will be Edwin Lyman, Director of Nuclear Power Safety at the Union of Concerned Scientists. Edwin has doctoral and bachelor's degrees in physics and currently serves on a National Academy's committee studying nuclear fuel cycles in advanced reactor waste. He co-authored the book, Fukushima: The Story of a Nuclear Disaster.

The second outside speaker will be Kati Austgen, a senior project manager for new reactors at the Nuclear Energy Institute. Kati has master's and bachelor's degrees in nuclear engineering. She leads the Advanced Reactor Regulatory Task Force which is focused on leading industry efforts to resolve regulatory issues and implement recommendations for ensuring an efficient and predictable regulatory framework appropriate for demonstration of advanced reactors by 2025 and commercialization by 2030.

Each speaker has been allocated 10 minutes. Depending on the length of a presentation, there may

be time within the allotted 10 minutes for one question at the end of the presentation. There will also be a 10-minute period at the end of the session for questions directed at any of the speakers.

The panel will then stay on for at least 15 more minutes until noon for even more questions and extended discussion. Any questions in the queue but not raised during the session will be captured by the system and provided to the session chair and liaison for appropriate handling post-conference. Now at this time, let me pass the floor to Jack Cushing who will present on our proposed Generic Environmental Impact Statement for advanced reactors.

MR. CUSHING: Thank you, Peyton. I'm Jack Cushing, and I'm a senior environmental project manager in the Environmental Center of Expertise at the NRC. I will be describing the work we are doing today in development a Generic Environmental Impact Statement.

Now at the NRC, we use a lot of acronyms and then make words out of them. So in this case, the Advanced Reactor Generic Environmental Impact Statement, or G-E-I-S, is called a GEIS. And that's how I'll be referring to it throughout the presentation. Next slide, please.

So what is an Advanced Reactor GEIS? The Advanced Reactor GEIS evaluates the impact of constructing, operating, and decommission an advanced reactor. It evaluates issues that can be generically -- or that term means, in this case, the common impacts of an advanced reactor to resources such as land use, water use, socioeconomics, accidents, and fuel cycle impacts.

Some issues require site-specific information such as endangered species, historic and cultural evaluations, and environmental justice. They need site-specific information because without knowing the site, we would not know its endangered species or historic cultural resources or minority or low-income populations that are a part of environmental justice evaluation.

So how will the GEIS be used to streamline the environmental review? An applicant for an advanced reactor is required to submit an environmental report evaluating the environmental impacts of their project. An applicant can reference the GEIS on issues that were resolved generically and demonstrate that they are bounded by the analysis in the GEIS and only need to look for new and potentially significant information

that was not considered in the GEIS. The NRC will then issue a site-specific supplemental EIS and evaluate any site-specific and generic issues that are not bounded by the analysis in the GEIS. Next slide, please.

So when you evaluate the environmental impacts of an advanced reactor, we don't know the design or even where it will be sited. The NRC made a set of bounding values and assumptions about the designed called a plant parameter envelope and did the same for a hypothetical site called a site parameter envelope. Now the plant parameter envelope, one of our key assumptions is that the design will meet NRC regulations.

Now the GEIS has largely decoupled the analysis from reactor power level from most resource areas. An example of how this is done is water use. Generally, the larger the reactor, the more cooling water it will use. We decided to evaluate the impacts to water use not on reactor size but on the amount of water that the reactor will use versus amount of water that's available to be used. If a reactor is located on a river, then the amount of water use would be limited to three percent of the mean low water flow with the

assumption the plant would be able to get their required Clean Water Act permits. Now limiting it to three percent of the mean water flow is the larger the river, the greater the amount of water available. Now the GEIS will also consider construction and operational impacts for advanced reactors.

In addition, the GEIS will incorporate by reference the continued storage space in the decommissioning GEIS. The applicant, when they reference those in their application, would need to demonstrate that their storage of -- for continued storage, that's the storage of fuel after the period of operation that they would be storing it in the same manner as was stored for light water reactors that were evaluated in the Continued Storage GEIS, and decommission, that their plant would be decommissioned in the same manner as evaluated in the decommissioning GEIS. Now the results of the ANI GEIS (phonetic) will be codified in rulemaking similar to what we've done for licensed renewal. Next slide, please.

Now the rulemaking package, we're not just doing a GEIS. But because we are making it a part of our rules in 10 CFR 51 include other documents such as the statement -- the rule language, statement of

consideration, and guidance documents. The guidance documents will be our Regulatory Guide 4.2.

We're putting in an appendix that will inform applicants how to reference a GEIS in their application. And we're also doing a companion appendix in NUREG-1555. That's the environmental standard review plan. That provides guidance to the staff on how to evaluate an application that referenced the GEIS.

Now we'll publish the proposed rule for comment, and that will have a 60-day comment period. Now the 60-day comment period gives an opportunity for the public and other interested parties to provide comments. We would then take the comments. We'd address them, and we'd revise the GEIS and the rule as appropriate and then issue the final rule. Next slide, please. Are there any questions?

MR. DOUB: This is Peyton Doub. We have one question for Jack. If an advanced reactor is proposed to be built on an existing nuclear power plant site, will the existing site's EIS be directly applicable to the advanced reactor?

MR. CUSHING: Typically, we do reference the EISs that are -- that have information that's applicable to it. So typically if it's located and

we've recently done an EIS for an advanced -- for existing reactors, we would reference a lot of that information and would also describe what would be done for the new project itself.

MR. DOUB: Thank you very much, Jack. Our next speaker is Ken Erwin.

MR. ERWIN: Good morning, everyone. As Jack said, I'm Ken Erwin, Chief of the Environmental Review New Reactor Branch in the Environmental Center of Expertise. I've been at the NRC for almost 25 years, the last 6 of which have been in this branch. Next slide, please.

A big part of our transformation and modernization efforts in the NRC's NEPA process is the implementation of several major rulemaking or proposed rulemaking efforts. These efforts are intended to improve the NEPA review process at the NRC while still ensuring the NRC's high level of technical excellence in meeting its NEPA requirements as well as maintaining our high level of public involvement. As you can see on this slide, there are five major items that I'm going to discuss today.

First, as part of the internal transformation effort that the staff has initiated in

the past two years, the staff has undertaken a significant effort to propose to the Commission a review of 10 CFR Part 51. The staff believes that the NEPA implementing regulations in Part 51 can be improved. Based on the large amount of recently completing licensing actions, the staff can apply best practices and lessons learned from these reviews to improve these regulations and future NEPA analyses.

The staff has also received substantial public meeting feedback regarding possible improvements to Part 51 from dozens of public and stakeholder meetings over the past several years, including the monthly advanced reactor stakeholder public meetings. The staff has also received feedback on its NEPA processes from its awareness and participation in government-wide efforts such as FAST-41, EO 13807, NEIMA, and the Council for Environmental Quality's final rule updating its NEPA implementing regulations issued last July. Feedback from these activities has been -- the existing reviews discourage new reactor applications or that some NEPA reviews have been expensive and time consuming.

Also, feedback has been -- and under current regulations in Part 51, new reactor

applications require the preparation of any EIS, although an EA may be sufficient to comply with NEPA for some applications. Other things such as Table S-3 and S-4 in Part 51, which are fuel cycle and transportation-related tables respectively, were developed for large light water reactors and may not be applicable for new designs, especially those that use different types of fuels than in the past. The current 10 CFR Part 51 rule is essentially the same rule that NRC issued in 1984 in response to CEQ's original NEPA implementing regulations that were issued in 1978.

There have been a few narrowly focused changes to Part 51 since 1984. However, the NRC has not made major changes to Part 51 that concern the process by which the NRC implements its NEPA reviews. The staff and management have been discussing possible changes to this rule since mid-2019.

If this rulemaking is approved, the staff envisions that it would be a comprehensive review of the entire text of Part 51 to update and streamline the NRC's current NEPA implementing regulations. It would also streamline and improve plain language in the regulations, reduce redundancy and repetition of

language, clarify ambiguous regulatory language, simplify language to enhance readability, enhance technology-inclusive language, and add new sections that address designs other than large light water reactors and uranium fuels. The paper currently with the Commission is SECY-21-0001 and is dated December 31st, 2020.

The staff has four other major rulemaking efforts that I will discuss next, first, categorical exclusions. Categorical exclusions, or CATEXs, are categories of actions that do not require environmental assessment or environmental impact statement under NEPA because the NRC has previously determined the action doesn't not individually or cumulatively have a significant effect on the human environment. These exclusions are listed in 10 CFR Part 51.22. The NRC last evaluated and updated this list of CATEXs in 2010. Given its NEPA review experience since 2010, the staff has identified additional recurring actions that may be eligible for categorical exclusion because these types of actions do not result in significant environmental impacts.

For example, potential candidates for categorical exclusions include those where after

completing numerous EAs, the NRC has always concluded there are no findings of significant impacts. In November of last year in SRM SECY-20-0065, the Commission approved the staff's recommendation to initiate a rulemaking to amend the categorical exclusions in Part 51. The staff has completed a large internal outreach and developed a summary of potential rulemaking changes to 5122c that was notice of proposed rulemaking.

Second, you've already heard from Jack about the ANR GEIS. So I won't discuss this further except to say that I believe that this document could be one of the premier NEPA implementing documents at the NRC for years to come. So please contribute to this process as we move forward through the rulemaking process and issue the draft EIS.

Third, the staff is proposing to update Part 51 in Appendix B which discusses the license renewal of nuclear power plants. These regulations state that on a ten-year cycle, the Commission intends to review the material in this appendix, including the summary of findings on NEPA issues for license renewal of nuclear power plants which are found in Table B-1. This ten-year review was initiated in April 2020,

approximately seven years after the completion of the previous revision in June of 2013?

The staff conducted a preliminary review of Table B-1, published a scoping meeting notice in the Federal Register in August 2020 indicating the results of the staff's review and inviting public comments and proposals for other areas that should be updated. Four public scoping meetings were held in August 2020 during a 90-day public comment period. Finally, the staff is undertaking a rulemaking to create new part to NRC regulations, 10 CFR Part 53, which would develop the regulatory infrastructure to support the licensing of advanced nuclear reactors.

This rulemaking would revise the regulations by adding a risk informed, technology inclusive regulatory framework for commercial advanced nuclear reactors for optional use by applicants in response to the Nuclear Energy Innovation and Modernization Act, or NEIMA. The staff has been holding public meetings and workshops with external stakeholders to present and discuss significant sections of this rule during each phase of the rulemaking and will continue to do so as these sections are developed and Part 53 is completed. Importantly,

the environmental regulations in Part 51 will be referenced by the proposed new regulation. Next slide, please.

As you can see, the NRC is implementing a large amount of change in its environmental review process, including organizational change, revision of internal processes and procedures, development of major new rulemakings, issuance of new guidance, and full awareness and participation as appropriate with external federal efforts led by OMB, CEQ, and the Federal Permitting Improvement Steering Council. All of these efforts have the goal of further improving the efficiency and effectiveness of NRC's NEPA review process as well as adding transparency and increasing accountability while still ensuring the technical accuracy and expertise that the NRC has long been known for.

With all of this change comes opportunity. We very much hope you take advantage of this opportunity and provide your comments and input to these various improvement efforts. And now I'll take any questions.

MR. DOUB: We have no questions at this time. I think I will go ahead and go on to the next

speaker, and I'm sure we're going to have a lot of questions at the end. So our next speaker is Edwin Lyman of the Union of Concerned Scientists.

MR. LYMAN: Hi, let me know if there's an issue with the sound as I speak. Just gesticulate wildly. Yeah, so I really appreciate the opportunity to present the views of the Union of Concerned Scientists on NRC's environmental review processes. Next slide, please.

So we heard about some of the efforts that the NRC is undertaking to what they call modernize and transform their environmental review processes. And we do agree that they need to be revised, but not in the way that we've heard already today. In fact, the proposals articulated in the SECY-21-0001 rulemaking plan are deeply flawed, and we think that document should be withdrawn.

Why? Well, first of all, it references two executive orders from the prior administration that the Biden Administration has already withdrawn. So there's no point in the NRC -- the NRC is not bound by any executive order. As an independent agency, it chooses the ones to accept. But it certainly shouldn't choose to follow executive orders from an

administration that frankly was dedicated to gutting the environmental protections in our country.

And there's absolutely no reason why the NRC should continue to even reference those documents. Meanwhile, the Biden Administration has introduced an executive order with sweeping implications for the environmental reviews, including addressing the impacts of climate change in NEPA reviews and also doing a better job of assessing environmental justice issues and disproportionate impacts of the government's federal actions that have an impact on the environment to make sure that they do not disproportionately impact disadvantaged groups, people of color, and economically challenged groups. So we think that that's the direction the NRC needs to go. Next slide, please.

So what are some of the gaps in the way the NRC currently evaluates NEPA? Well, the main doctrine for NEPA is to take a hard look. And the way I see it -- and I'm not a lawyer. And probably a lot of the things I say here won't pass legal muster. But I don't really care what the law requires the NRC to do the absolute minimum. That's not what concerns me. What concerns is what's right and what's technically valid and what does justice to the public health and

safety of the people of the United States who deserve to know those fulsome evaluations of the impacts of any project, especially involving nuclear power plants.

This is the anniversary week of the Fukushima -- the tenth anniversary of Fukushima. Anyone who can tell me that the NRC's environmental reviews ever envisioned or considered, much less evaluated, the full impacts of what we've seen in Fukushima, including the fact that ten years after the accident they are still trying to contain radioactive water flows leaking into the environment. They have more than a million tons of contaminated water that they're struggling to figure out what to do with before these tanks leak after the next earthquake or tsunami. There are tens of thousands of -- actually millions of tons of contaminated soil accumulating in bags all over the environment they have no place to put in Japan.

Don't tell me that the NRC's NEPA analyses have done a hard look at the impacts of the severe accident that could lead to those consequences. So we're not just talking about the actual radiological consequences of the accident itself, the direct impacts on public health and safety, but also these unusual environmental impacts which I would think if people

really doing what NEPA requires, taking a hard look, they would actually understand and appreciate those better. So there's absolutely no reason to start curtailing or diminishing the scope of what NEPA is evaluating for any type of reactor.

So NEPA doesn't evaluate -- it doesn't take accidents -- severe accidents and actually just look at the consequences on the public. It always tempers them by multiplying by probabilities which are highly uncertain, developed from probabilistic risk assessments with large uncertainties. That conceals or diminishes the impact of these accidents on the public by forcing the public to actually unpack what the real impacts of these accidents are.

It doesn't require evaluation of sabotage except for the Ninth Circuit. So only sabotage attacks in the Ninth Circuit have to be evaluated. Even though the sabotage attack is divorced from probability, this is an event where you can't predict, you can't exclude it from happening based on low probability, and it could have major environmental consequences. And that's why it's so important to evaluate sabotage. And Department of Energy's NEPA analyses evaluates sabotage. There's no reason why NRC doesn't.

I recall Atomic Safety and Licensing Board decision dated, I think September 10th, 2001 in a case that I was involved in that said, sabotage attacks are remote and speculative and you don't have to consider them. That was September 10th, 2001. So don't tell me that the NRC has been doing a good job of doing a hard look.

It doesn't evaluate the impacts of proliferation -- nuclear proliferation, the potential for nuclear materials to be in nuclear weapons which clearly have environmental impacts around the world and something which is going to be more serious given some of the non-light water that are now being contemplated which would use nuclear weapon usable fuels. It doesn't assess the impacts of onsite indefinite storage of spent fuel forever in a credible way because it assumes that the Nuclear Regulatory Commission is always going to be in existence. And hopefully, that's true.

But let us assume that is not credible. And the idea that there will be administrative control over nuclear waste forever to keep replacing it when the package in terms of storage deteriorates and there'll be someone there to repackage in a regulatory

-- in an appropriate and safe way. That's not taking a hard look.

And finally, what about the impacts of climate change? I'm hopeful that the Biden Administration's executive order will compel the NRC to take a harder look at the impacts of unpredictable and changing climate impacts on nuclear power operation, including the potential for severe weather conditions to exceed the design basis in ways that are not currently evaluating safety regulations. So those are some of the aspects. Next slide, please.

And possibly most important is addressing inequities in a meaningful way in an environmental review. And if you look at the environmental impact statement for Vogtle 3 and 4 AP1000, you'd see the statement that's on the slide. I won't read it, but the basic idea is this isn't going to have any real impact on anybody. So it doesn't matter if it has a disproportionate impact because it's still not important.

That's not good enough. You have to look at the differential impacts. And so just excluding something based on low probability, it's not sensitive to those impacts. What are some of those disparate

impacts?

Well, in NRC's environmental reviews for license renewal for new reactors, they have what are called severe accident mitigation analyses or severe accident design mitigation analyses in which the cost and benefits of modifications to the current design are evaluated. And how are the benefits calculated? Well, there's a monetary equivalent of cancer debt essentially, and that's called the statistical value of the human life. That's one piece.

And that is a uniform number. Right now, it's 2,000 dollars per person-rem. No matter who that person is, it's an average. And that is essentially a monetization of the cancer fatality risk associated with radiation exposure.

Now that is something -- that value assuming it should not be a uniform value over the course of the population because disadvantaged groups, Black Americans have higher cancer mortality. In other words, the risk of dying of cancer after a cancer incidence is higher than for white Americans. And that is not reflected using this uniform statistical value.

There are many other examples. I don't have time to go into them. But I think those analyses,

there has to be a top-to-bottom review of whether the NRC is making environmental decisions without fully evaluating and in compliance with their current obligations for environmental justice, much less doing a more comprehensive review. Next slide, please.

We heard a lot about the Generic Environmental Impact Statement for so-called advanced reactors. I think this is a symbolic gesture and a waste of time because there is no such thing as an advanced reactor that will magically fit into the envelopes that we're hearing about. So my sense if these studies are done in a serious way, the generic part of any of those impact statements is going to be so minor to be meaningless because you have sodium-cooled fast reactors, you have high-temperature gas-cooled reactors, you have molten-salt reactors, you have liquid fueled and solid fueled molten-salt reactors.

Even within each of those classes, they have different materials, different fuel cycles, and different impacts. And there's just no -- it's just a talking point so the NRC can say, these are all super safe. We can just put them in this generic box and don't have to look at it. Well, that's not going --

I don't think there's any technical justification for that. I don't think a rulemaking for this GEIS is technically meaningful. And just last slide, please.

And so if you think a micro-reactor has negligible environmental impacts, that you can do an environmental assessment or even a -- and there's a finding of no significant impact, just look at some of the numbers for some old micro-reactor, I think 20 megawatts thermal, that would have an impact on offsite public. This was calculated for the Idaho National Laboratory. But 4.7 kilometers away from the reactor accident, you could have offsite doses in the order of hundreds of thousands of rem which are not small impacts. So I would just offer that and probably have gone too long. So I thank you for your time. I'd be happy to take any questions.

MR. DOUB: Thank you very much, Ed. I think I will proceed to our final presentation and then questions are appearing. And I will ask them during the question-and-answer period. So at this time, I would like to hear from Kati Austgen, please.

Kati, you will need to unmute.

MS. AUSTGEN: Yes, I will. Thanks, Peyton. I'm Kati Austgen with the Nuclear Energy

Institute. And I appreciate the opportunity to share our perspective on transforming and modernizing the NRC's environmental review processes. I'll take the next slide, please.

As we've heard this morning, there are certainly some challenges and opportunities in this area. The National Environmental Policy Act was legislated and created with the intent to inform federal actions based on an assessment of their likely environmental impacts. Some of what we've heard today is that the implementation of NEPA has sometimes caused undue delays in licensing review times and associated cost increases.

We think this is particularly important for advanced reactors because as with all nuclear energy technologies, there are avoided carbon emissions and other environmental benefits that have been proven over the last decades and that we expect to continue. Some of those benefits include small footprints and the opportunity to improve jobs available and help to actually care for the environment. So all this to say that advanced reactors are expected to result in small environmental risks and need to be reviewed proportionate to their potential environmental

impacts. I'll take the next slide.

In March of last year, NEI provided NRC a white paper on recommendations for streamlining environmental reviews for advanced reactors. The report included the six recommendations summarized on this slide. The NRC activities described by Jack and Ken provide an opportunity to further explore and address these recommendations.

We appreciate the NRC efforts to modernize processes related to the following. One, allow for the flexibility to use environmental assessments and categorical exclusions. Requiring an environmental impact statement without consideration of the characteristics of advanced reactors and the history of current reactors is not commensurate with the anticipated environmental impacts per NEPA.

For the NRC to leverage environmental assessments in the environmental reviews of advanced reactors, the NRC will have to change the current regulations which prescribed to the NRC which actions require an environmental impact statement. This recommendation is focused on the NRC considering how it can provide more latitude to consider categorical exclusions based on the circumstances of proposed

action as well. We look forward to engaging in the process for the rulemaking that Ken described.

Second, increase the use of Generic Environmental Impact Statements. We're encouraged by the NRC progress on this front, and we agree with the staff approach to use bounding envelopes to allow for the inclusion of as many new reactors as can meet the performance-based criteria. In particular, I'll note the importance of the assumption that a new reactor that is bounded by the plant parameter envelope meets the NRC's safety review requirements and the equally important confirmation of this in any final NRC action.

Third, the opportunity to incorporate existing environmental analyses into a project's environmental assessment or environmental impact statement. Requiring an environmental impact statement without consideration of the characteristics of advanced reactors and the history of current reactors again is not commensurate with their anticipated environmental impacts per NEPA. Finally, the flexibility to use the applicant's environmental report as a basis for -- I'm sorry. This is not finally.

This is the fourth one, flexibility to use the applicant's environmental report as the basis for

the draft environmental assessment or environmental impact statement. Preparation of the environmental review is an expensive endeavor for applicants and currently serves as the basis for preparation of the NRC's environmental impact statement. Unfortunately, as conducted to date, the NRC's environmental impact statement preparations duplicate the applicant's efforts to develop an environmental report.

This wastes time and level of effort and results in costs that are then charged back to the applicant. The NRC can amend its regulations by looking to federal agencies that allow more applicant participation in the environmental review process. And there are a few examples of this, but one I'll include is FERC, the Federal Energy Regulatory Commission.

Fifth, the NRC has an opportunity to reduce unnecessary burden on alternative site analyses. The Council on Environmental Quality did complete their update to the NEPA regulations last year, and that included indicating that reasonable alternatives should be analyzed with a lens of what is actually feasible based on the purpose and need and the applicant's goals and the agency's statutory authority.

It would be more appropriate to limit the requirement to a description of the process used to select the site which is likely more important for advanced reactors, many of which will be sited in specific locations to meet a specific need, not just grid electricity but perhaps process heat or use in remote villages and applications where you really cannot site the reactor in another location to still meet the community need.

Six, increase the efficiency of environmental reviews. Consistent with the NRC principles of good regulation and organizational values, the agency strives for efficiency and continuous learning. Many of the procedural efficiencies identified for the safety review should also be considered to increase the efficiency of the environmental reviews.

Additional contributing factors that once addressed in the environmental review context should help achieve and sustain increased efficiency. And we look forward to working with the NRC through the rulemaking process, through the development of the guidance to go with these rulemakings, to see these improvements come to fruition. In conclusion, I'll note that enabling the efficient licensing of new

reactors through the transformation and modernization of the NRC's environmental review processes will be a key contribution to meeting U.S. climate and decarbonization goals as indicated by the current administration. Thank you.

MR. DOUB: Thank you, Kati. At this time, we do have a number of interesting and insightful questions. So I'm going to start with those. And the first question is, this is for Jack Cushing, how does the Advanced Reactor GEIS address the uncertainties of a rapidly changing climate for reactors that would presumably operate for decades? Returning to your water flow example, how you do foresee future constraints?

MR. CUSHING: Thank you, Peyton, and thank you for whoever provided that question. And when we started the Advanced Reactor GEIS, we did realize that climate change, we could not do that generically because just in the definition of the word, climate is constantly changing and it's also very site specific. So we could not do that generically. So in the environmental report and the supplemental EIS that will be done for the application, we would evaluate it at that time.

MR. DOUB: Thank you, Jack. Our next question which is also for Jack is, what about quality of discharge of cooling water back to the river? Is that addressed in the GEIS?

MR. CUSHING: Yes, that's -- the assumption in the GEIS is that the Clean Water Act has a national pollution discharge elimination system permit that goes along with it that controls the discharges to the environmental. And the NRC also has radiological regulations. And the assumption is that the applicant will meet both those permit requirements.

MR. DOUB: Thank you, Jack. Our next question is for Ken Erwin. Several of the advanced reactor fuels have very different physical and chemical characteristics, for example, uranium metal or molten salt. How is long-term storage of these spent fuels handled in the GEIS? Jack, you could also jump in on this.

MR. ERWIN: Yeah. Well, thank you for the question. We do appreciate it. So we do address in the GEIS. We are aware of the different types of fuels and storage capabilities.

And so what we're doing is we're doing a comparison to the existing technology and the existing

framework for storing these fuels. And then the staff or the applicant would do a comparison of the source term and some of the technical parameters involved to see if they fall within some of the limits that have already been determined. But yeah, I don't know, Jack, if you want to add some more to that about --

(Simultaneous speaking.)

MR. CUSHING: Yeah, and that pretty much captures it. We already store spent fuel, and we (audio interference) in the continued storage GEIS. And our expectation is that the advanced reactor fuel would be if it's stored in a similar manner in a cask, either onsite or away from the reactor or in a geologic repository, all of which were evaluated in the continued storage GEIS, and they would meet NRC regulations for the casks -- approved cask, then the environmental impact would be very similar. So that's how we're addressing it in the Advanced Reactor GEIS.

MR. DOUB: Thank you. Our next question is for Ed Lyman. Why should non-proliferation issues be addressed in an environmental impact statement? That's pretty far afield from the original intent of the National Environmental Policy Act.

MR. LYMAN: Yes. Well, I think I did

explain why, first of all, a nuclear proliferation is an event that could have significant environmental impact. So clearly, it is an expansive interpretation. But I think it's consistent.

And I would point out that the Department of Energy in the past has voluntarily conducted non-proliferation impact statements for federal actions that could have potentially significant impacts on nuclear weapons on proliferation, including the plutonium disposition program. So there is a precedent for that in other agencies. And I would offer that it is appropriate because of those potential environmental impacts of nuclear weapon detonation.

MR. DOUB: Thank you very much. The following question is for Ken Erwin. Public opinion in nuclear as mentioned is tied to environmental concerns. What are some of the best practices, lessons, and challenges that the NRC can share with other regulators on mediating and protecting nuclear energy and technologies, SMRs for example, that can improve public perception on nuclear energy?

MR. ERWIN: Thank you for the question. That's a complicated one. So the NRC, we do participate very heavily with what's called the FPISC, the Federal

Permitting Improvement Steering Council.

So this was a group that was set up by FAST-41 which is Fixing American's Surface Transportation Act, Title 41. It was passed in 2015. And in this setup, a government-wide group of people that would meet and discuss best practices from environmental reviews, and really ways to increase the transparency and the accountability of some of these environmental reviews make the EISs clearer, easier to ready, hopefully, I think, make them shorter. I think some of our recent examples were, like, 2,200 pages, and it set goals of, like, 300 pages.

So through that, we've shared a lot of our best practices and we've also learned a lot from other groups in the federal family. I think FERC is a heavy participant, Department of Energy, Department of Interior. They do a lot of EISs.

And one of the main things that we emphasize at the NRC in terms of increasing our transparency is really the public meeting process. So we usually have pre-application meetings if a possible applicant wants to partake in that. We have other ways to engage with the public during a review.

We'll have publication of whatever of the

draft EIS. So that's a place where the public can give comments, and then the staff will answer those comments and share the results of the analysis there. There's the final environmental impact statement, and then there's a hearing which is also open to the public.

So there's a lot of ways for the public to get involved. Some of the stuff I talked about in my presentation, it's called the rulemaking process. So there's a lot of places for the public to get involved during that. And we do hope that the public will be involved in some of the rulemakings that are ongoing with the AR GEIS. And if any of the futures ones, if we do get permission from the Commission to open up Part 51, we'd be looking for input there.

The CATEX rulemaking, I think that the advanced notice of proposed rulemaking is going to come out in the Federal Register sometime in the next few months there. So that's a great opportunity also to submit input. And we'll ask questions in the Federal Register about how the public thinks the NRC should change its regulations related to that rule. So those are all great opportunities we think to get involved.

MR. DOUB: Thank you, Ken. Our next question is for Ed Lyman. How do you recognize the

environmental justice benefits associated with nuclear power as a result of energy generated without any particulate matter or other pollution that disproportionately impacts low income communities should that emissions free energy be recognized as an environmental benefit during an environmental review?

MR. LYMAN: Yeah, the short answer is yes. I think it should become clear that I think that NEPA reviews should be sufficiently broad to address all these kinds of questions. In this particular context, I think it does have to be as part of the alternatives analysis. And as we heard from other speakers, the alternatives should be credible.

So if you're talking about if it's a reasonable alternative that a fossil fuel plant would be built instead of -- or a coal plant is what we're really talking about here instead of a nuclear plant in a particular area and that's a reasonable alternative, you should assess that, absolutely. But it's really the NRC. The NRC's main obligation is radiological public health and safety.

And my main point is that the NRC needs to evaluate that in a full manner and not let those impacts or disproportionate facts go unevaluated. In

certain circumstances, the NRC is also evaluating. There's a draft rulemaking that would potentially eliminate emergency planning requirements offsite.

For nuclear power plants, it would change the siting guidance to allow nuclear plants to be located in densely populated urban areas. And certainly in those cases, even if the safety requirements, whatever they are, are met, NEPA requires that you challenge and take a hard look at what if you have beyond design basis impacts under those circumstances. And not only should you evaluate the absolute radiological impacts but also these disproportionate facts. And certainly again, reasonable alternatives should also be evaluated, including renewable energy and efficiency. So thank you.

MR. DOUB: Thank you very much. Our next question is for Kati Austgen. Would you please say more about what it would mean for the agency to use the applicant's environmental report as a basis for an EA or EIS?

MS. AUSTGEN: Sure. Thank you for that question. So what it would mean is less rework, more reliance on the companies or the contractors that they

have employed to do some assessment of the site that they are looking at. It would involve NRC doing a confirmation that that information provided by the applicant is correct and accurate. But then it should result in a faster turnaround to get that assessment out to the public and into that public dialogue with stakeholders for any feedback.

Was there something that was missed? Probably not, but there could be. And so it just gets that information out sooner and allows a real reliance on the experts in a particular area to provide that information and to adequately characterize it. And then it allows the NRC to do their job of confirming the information and making that assessment of the environmental impacts.

MR. DOUB: Thank you. Our next question is for Jack Cushing. What is the schedule for publishing the final Advanced Reactor GEIS or ongoing new advanced reactor effort? Can the draft or final GEIS be referenced and used prior to publishing the final rules that update Part 51 and revisions to Regulatory Guide 4.2 and other guidance documents?

MR. CUSHING: Well, as the -- right now, our target is February 2023 for issuing the final rule.

Now the other parts of the question is when you do rulemaking like license renewal to rely on it and it needs to be codified in the rulemaking. So the GEIS is not going to be issued before the final rule, and the draft will be sent out earlier and then we'll be revising it.

Now an applicant can read over our draft GEIS. But they would have to take any information in there and put it into their supplemental EIS as applicable to their site before because it wouldn't have been codified in the rules or the final EIS. So you can't take it quite like license renewal that's already in the rules.

MR. DOUB: Thank you, Jack. Our next question is for Ken Erwin. The NRC has issued a risk SMART approach. SMART is acronym S-M-A-R-T. How is the environmental review process utilizing this approach for risk informed analysis of environmental issues?

MR. ERWIN: Yeah, that's a great question. So we are participating in a risk SMART initiative at the NRC. I think the biggest thing that we did, we moved all the environmental staff over to one area.

So there used to be three separate branches

of environmental staff. Now they're all in one division rather than being spread out across three different offices. So that has helped an immense amount in terms of cross training, knowledge management, sharing of best practices.

And then the next things we've done is we've developed what we call a transformation initiative. So we've gone through and we've taken surveys across the staff and across some of our other federal counterparts and also looked at some of the stuff that they've been done, some of the stuff CEQ has done and FPISC has done. And we've developed a list of things that we can do to essentially improve the environmental review process.

And Peyton talked a little bit about that. So we've developed essentially a handbook of environmental practices. We've got a separate SharePoint site that's got a toolbox so we can use that to train new people. We revamped our environmental technical reviewer qualifications. We've issued new guidance. So we've issued ISG-29.

And then you're hearing about some of the things that we're doing now, right? We're looking at a GEIS for advanced reactors which is these facilities

don't exist. And here we are looking at innovative ways to do some environmental review there.

And then we've got some of the rulemaking that's going on. How can we fix Part 51 in certain targeted areas and if the Commission approves across the Board? And I talked a little bit about it. We are participating in all of the federal government-wide efforts to improve NEPA reviews primarily by making the reviews faster, reducing the size of the environmental documents, improving the readability.

Our internal goals are very aggressive, I think. We want to try and get our EIS documents down to approximately 300 pages on average and get these done in 24 to 36 months. So that's a huge difference from some of the stuff we saw at least in the new reactor arena where we had documents that were 2,000 pages and full of extremely difficult, mostly technical language.

So those are all things we're doing as part of the risk SMART initiative. And it's been going on for about a year and a half, and it's going to keep going on. And we're making a lot of great progress.

MR. DOUB: Thank you, Ken. This next question is actually directed to me, and it is define human environment. So I will quickly answer that, and

that is that the term, human environment, is derived from the original National Environmental Policy Act statute itself which was developed by a team that had a lot of background in socioeconomic planning. Basically, the reason that we assess impacts of physical resources such as land, water, and air is because those resources are of value to humans. So when we use the term, human environment, in the context of NEPA, one may think of that as being the environment.

Our next question -- hold on. I'm trying go down. The only other question I have at this point is -- and I'll direct this to Ken. Has any thought been given to developing a new appendix outlining all the requirements for decommissioning?

MR. ERWIN: I'm going to have to take that one to the parking lot. We'll get back to that one in writing.

MR. DOUB: We have a question for Ed Lyman. How do you expect or hope to see technology incorporated in the documentation of accidents, probabilities, and consequences?

MR. LYMAN: Well, in a way, it's currently done. So the EIS does evaluate severe accidents which go beyond the limits of NRC's design basis safety

analysis. And that's appropriate for the reasons I gave.

But there is a kind of legal position that you don't have to report the consequences in absolute terms. In other words, you don't have to report metrics like the total area of land contamination that you would expect from if you have an accident or the number of cancer fatalities that result. You can always multiply those numbers by the risk by the core damage frequency and a large early release frequency that's calculated for probabilistic risk assessment.

So you end up in some cases within an annual risk to the public which is from an accident which is lower than the risk for routine releases. And in the case of the Vogtle AP1000, that was the case. In other words, it looks like the risk from an accident is lower each year to the public than from routine plant releases which intuitively doesn't make a lot of sense.

So I would submit that it is appropriate to consider those separately because they have -- each component of risk has its own uncertainties. And to fully understand what goes into those numbers, it's good to understand the individual components. Then I raise the issue of sabotage where the probabilities

don't even matter or can't be calculated.

And then as I stated in new reactor or license renewals where this cost benefit analysis alternative design features to mitigate severe accidents is done, there's always been a question about how those analyses are done and whether they are sufficient conservative, whether they challenge the assumptions that are built into the safety regulations sufficiently, or that you look at sensitivities in a serious enough way. And again, the issue of environmental justice, I think, is something which has not been explored in those analyses and you would need to revise. The one example is the way the cost of an accident is calculated.

The way it's done in NRC's regulatory analysis is you look at the value of the property and land that's been contaminated to the extent that it needs to be condemned. And so this automatically builds in bias because you are -- the benefit of the safety modification would be greater (audio interference) severe accident mitigation alternative. So they would more cost beneficial in wealthy areas than in poorer areas. So that's counterintuitive again, and it shows that there may be some built-in

biases that need to be addressed.

MR. DOUB: I have one more question, and that is for Jack Cushing. Someone is asking about the procedures we use to estimate water use in the GEIS and the three percent of low flow in surface water bodies. Please discuss brown water use estimation considerations. This will be for Jack.

MR. CUSHING: Yes. Basically, we have technical experts that evaluate the surface and groundwater use. And I'm not the water expert, so I won't be able to discuss exactly what they used to determine surface and groundwater use. I did want to make one correction to the schedule. We plan to publish the final rule in January of 2024. So I apologize for the incorrect information on the slide. But it'll be January of 2024.

MR. ERWIN: Hey, Peyton. Hey, this is Ken again, just real quick. So about the question on the decommissioning, we do cover decommissioning in the GEIS or we will cover it in the draft GEIS, I guess. I hope that that was what the question was about.

MR. DOUB: I think it was more about, are we working in our transformation efforts to address how we do environmental reviews of decommissioning.

MR. ERWIN: Yes, we are looking to improve that. But yeah, if there is more specific information the person looks for, go ahead and put it into the chat or -- and maybe we can -- I guess. I don't know how much time we have left, but we can definitely --

MR. DOUB: We have about five minutes. I have now posed all the questions that have been formally advanced to me. Let me say that if there are any further questions, they will be passed to the RIC coordinator who will then dispose them for proper addressing after the conference.

I'd like to thank all of our speakers today for their fine presentations. I would like to thank the audience for their interest and for their insightful questions. And I simply want to say that we at the NRC are always open to hearing more, and we would like you to make your observations, concerns, and questions known to us. So thank you all very much, for your participation and your attendance.

(Whereupon, the above-entitled matter went off the record at 11:56 a.m.)