

From: AUSTGEN, Kati <kra@nei.org>
Sent: Monday, February 24, 2020 3:34 PM
To: AdvancedReactors-GEIS Resource
Cc: Beasley, Benjamin; Cushing, Jack; Sutton, Mallecia
Subject: [External_Sender] NEI Comments on Development of an Advanced Nuclear Reactor Generic Environmental Impact Statement [Docket ID: NRC-2019-0226]
Attachments: 02-24-2020_NRC_Industry Comments on Development of an Advanced Nuclear Reactor GEIS.pdf

THE ATTACHMENT CONTAINS THE COMPLETE CONTENTS OF THE LETTER

February 24, 2020

Office of Administration
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
ATTN: Program Management, Announcements and Editing Staff

Submitted via AdvancedReactors-GEIS.resource@nrc.gov

Subject: NEI Comments on Development of an Advanced Nuclear Reactor Generic Environmental Impact Statement [Docket ID: NRC-2019-0226]

Project Number: 689

On behalf of our members, the Nuclear Energy Institute (NEI) appreciates the opportunity to provide comments on the development of an Advanced Nuclear Reactor Generic Environmental Impact Statement (ANR GEIS). We support the NRC's development of an ANR GEIS as part of a comprehensive effort to streamline the agency's requirements, guidance and processes to meet the requirements of the National Environmental Policy Act (NEPA). Addressing generic elements of the environmental review once in an ANR GEIS is more efficient than performing the same analysis for every new nuclear reactor application. The attachment contains NEI's responses to the specific questions in Section III, "Specific Request for Information," of the Federal Register Notice and the questions posed on NRC staff slides in the November 15 and 20, 2019 public meetings.

An ANR GEIS can be developed to meet the NEPA intent to ensure that agencies consider the significant environmental consequences of proposed actions and inform the public about agency decision making. NEPA requires that agencies use reliable existing data and resources. It is appropriate, therefore, for NRC to base its analysis in an ANR GEIS on best-estimate values, without the need to undertake new scientific and technical research to inform their analysis.

If you have questions concerning this letter or the attached comments, please contact me.

Sincerely,
Kati Austgen



Kati Austgen | Sr. Project Manager, New Reactors

1201 F Street, NW, Suite 1100 | Washington, DC 20004

P: 202.739.8068 M: 202.340.1224

nei.org

This electronic message transmission contains information from the Nuclear Energy Institute, Inc. The information is intended solely for the use of the addressee and its use by any other person is not authorized. If you are not the intended recipient, you have received this communication in error, and any review, use, disclosure, copying or distribution of the contents of this communication is strictly prohibited. If you have received this electronic transmission in error, please notify the sender immediately by telephone or by electronic mail and permanently delete the original message. IRS Circular 230 disclosure: To ensure compliance with requirements imposed by the IRS and other taxing authorities, we inform you that any tax advice contained in this communication (including any attachments) is not intended or written to be used, and cannot be used, for the purpose of (i) avoiding penalties that may be imposed on any taxpayer or (ii) promoting, marketing or recommending to another party any transaction or matter addressed herein.

Sent through www.intermedia.com

Federal Register Notice: 82FR62559
Comment Number: 6

Mail Envelope Properties (c3c3566d4fa3416cb2e164b86d29dd77)

Subject: [External_Sender] NEI Comments on Development of an Advanced Nuclear
Reactor Generic Environmental Impact Statement [Docket ID: NRC-2019-0226]
Sent Date: 2/24/2020 3:33:37 PM
Received Date: 2/24/2020 3:33:43 PM
From: AUSTGEN, Kati

Created By: kra@nei.org

Recipients:

Post Office: nei.org

Files	Size	Date & Time
MESSAGE	3220	2/24/2020 3:33:43 PM
02-24-2020_NRC_Industry Comments on Development of an Advanced Nuclear Reactor GEIS.pdf		
115526		

Options

Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

KATI R. AUSTGEN
Senior Project Manager, New Reactors

1201 F Street, NW, Suite 1100
Washington, DC 20004
P: 202.739.8068
kra@nei.org
nei.org



February 24, 2020

Office of Administration
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
ATTN: Program Management, Announcements and Editing Staff

Submitted via AdvancedReactors-GEIS.resource@nrc.gov

Subject: NEI Comments on Development of an Advanced Nuclear Reactor Generic Environmental Impact Statement [Docket ID: NRC-2019-0226]

Project Number: 689

On behalf of our members, the Nuclear Energy Institute (NEI)¹ appreciates the opportunity to provide comments on the development of an Advanced Nuclear Reactor Generic Environmental Impact Statement (ANR GEIS). We support the NRC's development of an ANR GEIS as part of a comprehensive effort to streamline the agency's requirements, guidance and processes to meet the requirements of the National Environmental Policy Act (NEPA). Addressing generic elements of the environmental review once in an ANR GEIS is more efficient than performing the same analysis for every new nuclear reactor application. The attachment contains NEI's responses to the specific questions in Section III, "Specific Request for Information," of the Federal Register Notice and the questions posed on NRC staff slides in the November 15 and 20, 2019 public meetings.^{2,3}

An ANR GEIS can be developed to meet the NEPA intent to ensure that agencies consider the significant environmental consequences of proposed actions and inform the public about agency decision making. NEPA requires that agencies use reliable existing data and resources. It is appropriate, therefore, for NRC to base its analysis in an ANR GEIS on best-estimate values, without the need to undertake new scientific and technical research to inform their analysis.

¹ The Nuclear Energy Institute (NEI) is the organization responsible for establishing unified industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include entities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel cycle facilities, nuclear materials licensees, and other organizations and entities involved in the nuclear energy industry.

² 84 Fed. Reg. 62,559 (November 15, 2019)

³ "Exploratory Process for Developing an Advanced Reactor GEIS," ADAMS Accession Number ML19322A198

Program Management, Announcements and Editing Staff

February 24, 2020

Page 2

If you have questions concerning this letter or the attached comments, please contact me.

Sincerely,

A handwritten signature in black ink, reading "Katherine R. Austgen". The signature is written in a cursive style with a large, stylized 'K' and 'A'.

Katherine R. Austgen

Attachment

C: Benjamin Beasley, NRC/NRR/DANU/UARL
Jack Cushing, NRC/NMSS/REFS/ERNRB
Mallecia Sutton, NRC/NRR/DANU/UARL

Nuclear Energy Institute Comments on Development of an Advanced Nuclear Reactor Generic Environmental Impact Statement

The Nuclear Energy Institute (NEI) offers the following comments for consideration by the NRC staff.

FRN specific questions (a., b., c.)/Public Meeting discussion questions (1., 2...)	Comment/Recommendation
1. Should the scope of the ANR GEIS include reactors regardless of technology or be limited to specific reactor technologies?	<p>NRC should approach development of an advanced nuclear reactor (ANR) generic environmental impact statement (GEIS) with the intent to include performance-based parameters that envelope advanced reactors regardless of technology. All technologies should be afforded the opportunity to demonstrate an ANR GEIS' conclusions are applicable based upon their ability to meet the performance-based conditions. Moreover, NRC should consider that some designs may not fit neatly into one technology classification and the basis for any differentiation by technology should be clearly articulated.</p> <p>The ANR GEIS request for information appears to presume a single ANR GEIS covering a specific selection of designs. We support the creation of an ANR GEIS that encompasses the full range of advanced reactor technologies and potential site locations. We also recognize that the full range of technologies and sites is a large scope that may need to first focus on a small selection of common issues, with plans for later ANR GEIS revisions that further broaden the scope. For example, an ANR GEIS sub-section might address a more stringent performance criterion that results in significantly different environmental impacts, which only a subset of advanced designs could meet.</p> <p>The NRC should commence an ANR GEIS initiative, which should recognize that revisions, supplements, and/or an additional ANR GEIS may be necessary. The NRC should thereafter establish a working group or similar process to seek industry feedback on the scope of a first-revision ANR GEIS, based on potential common issues and those designs likely to come before the agency in the near term. The scope of the ANR GEIS should accommodate designs that are expected to be submitted for licensing and reflect stakeholder feedback.</p>
2. What reactor sizes (footprint) and power levels should the NRC include in the scope the ANR GEIS?	<p>The NRC should endeavor to make the ANR GEIS as broadly applicable as possible. We note that for certain potential environmental impacts it may be appropriate to have the ANR GEIS provide performance-based criteria that are scalable based upon the range of potential environmental impacts among different advanced reactor technologies. While performance-based criteria should be consequence-based (e.g., the environmental impacts), in very limited circumstances it may be advisable to use reactor or site characteristics (e.g.,</p>

**Nuclear Energy Institute Comments on Development of an Advanced Nuclear Reactor
Generic Environmental Impact Statement**

FRN specific questions (a., b., c.)/Public Meeting discussion questions (1., 2...)	Comment/Recommendation
	<p>reactor size or land usage) as proxies for some environmental impacts / resource areas.</p> <p>We appreciate the NRC looking at thermal power level; however, the proposed size categories NRC shared in the January 8, 2020 public meeting do not align with contemporary use of micro-reactor and small modular reactor (SMR) designations. Additionally, the associated land use estimates were inconsistent with advanced reactor developer expectations.</p> <p>If the NRC insists on using power levels to define reactor categories, then the following are more consistent with the designs being developed: 1) Micro-reactors (<50 MWth), 2) SMRs (<900 MWth), 3) large reactors (> 900 MWth).</p> <p>Likewise, the following foot print categories are more consistent with the reactor designs (and associated facilities) being developed: 1) Less than 10 acres, 2) Less than 100 acres, 3) Greater than 100 acres.</p> <p>Note that there may not be a 1:1 correlation between a particular advanced reactor's power level and foot print as categorized here. Additionally, beyond the land used for the reactor and associated facilities, it is not clear whether NRC is asking about land temporarily disturbed during construction and undisturbed land that is within the owner-controlled area.</p>
<p>3. One possible option NRC is considering is limiting the ANR GEIS to certain regions with common environmental conditions. Should the NRC consider the geographical site of a reactor when developing the scope of the ANR GEIS? Should the NRC consider a set of bounding</p>	<p>The NRC should approach the problem with the understanding that NEPA evaluations should be based on best-estimate conditions, and not "maximum" or "bounding" assumptions. The ANR GEIS should not be limited to certain regions with common environmental conditions. Bounding parameters should be used unless they unduly constrain or limit the breadth of ANR GEIS applicability. If a particular set of site conditions would limit the applicability of an ANR GEIS, then multiple ANR GEISs may be needed to address all of the regions where advanced reactors may be sited.</p> <p>The unique safety profile and operational characteristics, potential for reduced land usage, and, in some cases, the lower power ratings of advanced reactor designs are all expected to result in a wider set of regions for deployment. The ANR GEIS should be developed with this in mind. Bounding parameters should</p>

**Nuclear Energy Institute Comments on Development of an Advanced Nuclear Reactor
Generic Environmental Impact Statement**

FRN specific questions (a., b., c.)/Public Meeting discussion questions (1., 2...)	Comment/Recommendation
plant parameters when developing the scope of the ANR GEIS? If so, what parameters should be considered?	include parameters that impact the land, air, water, and inhabitants including the humans, animals, and vegetation. Details should be discussed in public meetings during ANR GEIS development.
1. Is there sufficient available information regarding types of technologies and environmental impacts to support development of an ANR GEIS?	<p>There is sufficient information available to support the development of an ANR GEIS. Maximum use should be made of existing information and details shared in pre-application interactions. In some cases, limited design information or initial bounding estimates will be available. Moreover, the NRC should include maximum consideration of the extent to which compliance with the NRC license and other federal, state, and local environmental permits is known to result in small and/or positive environmental impacts.</p> <p>In developing an ANR GEIS, the NRC should engage organizations actively developing advanced nuclear reactors to obtain any additional necessary information.</p>
2. Would an ANR GEIS improve the efficiency of the environmental review process and avoid duplication of effort?	<p>An ANR GEIS will improve the efficiency of the environmental review process and avoid duplication of effort. Any evaluation that is previously documented at a generic level would avoid use of applicant and regulator resources otherwise necessary to draw the same conclusion for each applicable technology and site.</p> <p>The goal of the ANR GEIS should be to address as many environmental impact issues and resource areas as possible and to minimize the scope of the environmental review for the applicant to address in site-specific supplemental information.</p> <p>The NRC should work with stakeholders to develop performance-based criteria and potential environmental impacts to include in the ANR GEIS, as well as the optimal scope and number of ANR GEIS to address the full range of advanced reactor technologies and regions for deployment.</p>
3. What are the costs and benefits of doing an ANR GEIS	The costs of doing the ANR GEIS include upfront support from the advanced nuclear reactor developers and time/resources from the NRC.

**Nuclear Energy Institute Comments on Development of an Advanced Nuclear Reactor
Generic Environmental Impact Statement**

FRN specific questions (a., b., c.)/Public Meeting discussion questions (1., 2...)	Comment/Recommendation
versus doing individual environmental reviews?	<p>The development of an ANR GEIS is likely to be only slightly greater than that of a single environmental impact statement (EIS) since there will be additional effort to ensure that the ANR GEIS has a broad range of applicability. However, the ANR GEIS is expected to save significant effort as a result of avoiding duplicative work on every individual environmental review for advanced reactors. Furthermore, the development of an ANR GEIS will enable the NRC to be more efficient.</p> <p>An ANR GEIS that minimizes the need for site-specific environmental impact reviews will also significantly reduce early regulatory risk for individual projects, which are important considerations in the business decisions.</p> <p>Development of an ANR GEIS is recommended. The purpose of any generic regulatory effort, in this case an ANR GEIS, is to reduce the total effort and costs by making a single decision that is applicable to multiple applications.</p>
4. Should the scope of the ANR GEIS include reactors regardless of technology or be limited to specific reactor technologies?	See response to FRN Question a., above.
5. What reactor sizes (footprint) and power levels should the NRC include in the scope of the ANR GEIS?	See response to FRN Question b., above.

**Nuclear Energy Institute Comments on Development of an Advanced Nuclear Reactor
Generic Environmental Impact Statement**

FRN specific questions (a., b., c.)/Public Meeting discussion questions (1., 2...)	Comment/Recommendation
6. Should the NRC consider limiting GEIS to geographical regions with common environmental conditions; or should the GEIS not be geographically limited?	See response to FRN Question c., above.
7. Should the NRC consider a set of bounding plant parameters when developing the scope of the ANR GEIS? If so, what parameters should be considered?	See response to FRN Question c., above.
8. Siting a. Where would the reactor be located? i. In or near a city or rural area? ii. Brownfield or greenfield site? iii. In an existing structure? iv. Co-located with existing power plant or other industrial facilities?	<p>An ANR GEIS should consider a range of site-related parameters to provide for the broadest practical coverage. Many advanced reactors are being designed with siting in proximity to existing power plants, other industrial facilities, and nearby cities in mind. The sites could be either brownfield or greenfield sites.</p> <p>There should not be <i>a priori</i> restriction of reactor sites. If the applicant demonstrates the potential environmental impact of the reactor plant on a site is within the ANR GEIS conclusions, then it should be permitted to reference the ANR GEIS.</p> <p>As discussed in the response to FRN Question c.: If a particular set of site conditions would limit the applicability of an ANR GEIS, then multiple ANR GEISs may be needed to address all of the regions where advanced reactors may be sited. However, the NRC should attempt to bound as many reactor locations as possible within a single ANR GEIS to maximize the benefits of performing a generic review.</p>

**Nuclear Energy Institute Comments on Development of an Advanced Nuclear Reactor
Generic Environmental Impact Statement**

FRN specific questions (a., b., c.)/Public Meeting discussion questions (1., 2...)	Comment/Recommendation
9. What is the size/dimension/power output level of the advanced reactor?	<p>Advanced reactor designs are being developed with power outputs below 5 MWth and over 1800 MWth. Advanced reactor site boundaries are expected to be 400 meters, or less, in radius. Designs with smaller power levels are expected to have smaller site boundaries.</p> <p>An ANR GEIS should consider a range of physical sizes and power levels, at a minimum, using information currently available (e.g., through pre-application meetings) and obtained from stakeholders during the development an ANR GEIS.</p>
<p>10. Construction considerations</p> <p>a. Will the reactor be constructed/assembled onsite or manufactured elsewhere for delivery and installation?</p> <p>b. How much land would be required to construct and operate the reactor?</p> <p>c. How many months is the construction period?</p> <p>d. What infrastructure will be needed (transmission lines, roads, etc.)?</p>	<p>An ANR GEIS should consider a range for each construction consideration to provide for the broadest practical coverage.</p> <p>(a) It varies – micro-reactors will likely have limited on site construction. SMRs and larger reactors may have as much as 3 to 5 years of on-site construction activities. Developers are planning to minimize the fraction of the design constructed onsite to optimize the overall construction schedule. Larger reactors are expected to have major components (e.g., reactor vessel) constructed/assembled onsite while others will be manufactured offsite and delivered.</p> <p>(b) Variable – Land usage (not including undisturbed owner-controlled areas) of the largest advanced reactors (~3,000 MWth) could be on the order of 100 acres, while the smallest reactors (5 MWth) could be as little as 0.1 acre. Construction may require the temporary use of additional land for a lay-down area.</p> <p>(c) Larger advanced reactors are working toward a construction period of 36 months from first concrete to initial fuel load. (Some first of a kind (FOAK) plants could require 60 months of construction.) SMRs and micro-reactors are targeting 36 months or less for FOAK construction, and could achieve shorter construction durations for Nth of a kind. Micro-reactors will have minimal on-site construction that could be completed in 6 months or less.</p> <p>(d) Road, rail or barge/waterway access will be necessary to transport the reactor components and fuel to the site. Micro-reactors and some SMRs will be factory built and site assembled. Other SMRs and larger reactors will be partially factory built and site assembled.</p>

**Nuclear Energy Institute Comments on Development of an Advanced Nuclear Reactor
Generic Environmental Impact Statement**

FRN specific questions (a., b., c.)/Public Meeting discussion questions (1., 2...)	Comment/Recommendation
	Other infrastructure needs will depend, in part, on the end user. Reactors sited to provide electricity will require connection to a local (micro grid) or nearby national grid. Reactors intended for high temperature process heat or dedicated electricity delivery to a nearby industrial facility will need corresponding connections.
<p>11. Operation Considerations</p> <p>a. How many years can the reactor operate without replacement?</p> <p>b. How many construction and operation workers? (peak and annual average)</p> <p>c. What radiological and non-radiological constituents will be emitted or released from the reactor during operations? (airborne and liquid)</p> <p>d. How does the reactor refuel (and how often)?</p> <p>e. Cooling system designs?</p>	<p>An ANR GEIS should consider a range for each operational consideration to provide for the broadest practical coverage.</p> <p>(a) Advanced reactors are under development with a range of operational lifetimes, from as little as 10 years prior to replacement of the entire reactor vessel to as much as 80 years of operations with a half core refueling cycle of 18-24 months. The potential for license renewal should be held open.</p> <p>(b) Advanced reactors are being developed with an expectation of reduced operating, maintenance, and security staffing requirements compared to large light water reactors operating today. The number of temporary construction and permanent plant workers will vary depending on the size and simplicity of the reactor. The largest reactors may require more than 1,000 construction workers and 300 plant workers, while micro-reactors may require fewer than 100 construction workers and fewer than 10 plant workers.</p> <p>(c) The radiological constituents vary by technology and NRC should consider the input gathered from stakeholders, e.g., through pre-application meetings. For example, some advanced reactors will have radionuclide constituents similar to light water reactor (LWR) facilities while the overall inventory would be much less. The total annual release rates from advanced reactor plants per year are expected to be very small with the main contributors to the activity released coming from noble gases and tritium. The NRC's rulemaking for advanced reactor emergency preparedness would allow a site boundary emergency planning zone (EPZ) for designs that are able to meet the dose requirements at that distance.</p> <p>The non-radiological releases will be slightly different from that of the LWR facilities for some advanced reactors due to the use of sodium coolants or molten salts.</p> <p>(d) The length of the fuel cycle varies by technology. Some designs will refuel roughly one-third of the core approximately every 18 to 24 months, similar to current LWRs. Other designs will refuel the entire core once every 10 or more</p>

**Nuclear Energy Institute Comments on Development of an Advanced Nuclear Reactor
Generic Environmental Impact Statement**

FRN specific questions (a., b., c.)/Public Meeting discussion questions (1., 2...)	Comment/Recommendation
	<p>years. Some designs will perform online refueling, either through fuel polishing for liquid fueled reactors or continuous refueling for pebble bed reactors. In the case of advanced reactors using online refueling, the only outages will be for inspection and maintenance purposes.</p> <p>(e) Cooling system designs may be site or customer dependent (once-through cooling, closed or partially closed cycle cooling, or air cooling). This includes conventional methods of removing excess heat during normal operation (e.g., natural/mechanical draft cooling towers and forced air condensers). Some advanced reactor designs will not rely on water as an ultimate heat sink; heat may be rejected directly to the atmosphere.</p>
12. Are there any factors or questions that NRC should be considering or asking, but isn't?	<p>NRC should keep in mind that the National Environmental Policy Act (NEPA) is intended to ensure that agencies consider the significant environmental consequences of proposed actions and inform the public about agency decision making. Agencies must use reliable existing data and resources, but are not required to undertake new scientific and technical research to inform their analysis. It is appropriate, therefore, for NRC to base its analysis in an ANR GEIS on best-estimate values. Similarly, NEPA evaluations should presume that the applicant will apply for, comply with, and meet conditions associated with all applicable federal and state licenses and permits. (That is, the facility will not be allowed to operate otherwise.) The ANR GEIS should be based upon the understanding that compliance with the NRC license and other federal, state, and local environmental permits is known to result in small or positive environmental impacts.</p> <p>Consideration should be given to life cycle minimization of site contamination. Potential questions to address could include:</p> <ul style="list-style-type: none"> • What barriers are provided to prevent airborne, land or water contamination? • What measures are provided to minimize waste generation over the operating life cycle and through decommissioning? <p>Consideration should be given to fuel cycle impact and transportation impact.</p> <ul style="list-style-type: none"> • Advanced reactor developers are generally planning for used fuel storage onsite or off-site at interim or long-term storage facilities. • Advanced reactor developers are generally mindful not to preclude the potential for future recycling of used fuel.

**Nuclear Energy Institute Comments on Development of an Advanced Nuclear Reactor
Generic Environmental Impact Statement**

FRN specific questions (a., b., c.)/Public Meeting discussion questions (1., 2...)	Comment/Recommendation
	<ul style="list-style-type: none"> • The NRC should continue to rely on the generic approaches to address the environmental impacts of continued storage of spent nuclear fuel beyond the licensed life for operation of a reactor, fuel cycle environmental impacts, and the environmental impacts of transportation of fuel and waste. However, rather than revise existing rules currently applicable for light-water-cooled nuclear power reactors (e.g., 10 CFR §§ 51.23, 51.51, 51.52), the NRC should confirm that existing evaluations are applicable to ANR (or if not applicable, perform any necessary new evaluations) in the context of an ANR GEIS and the associated rulemaking to codify the results of the ANR GEIS.