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Sent: Tuesday, June 30, 2020 3:12 PM
To: AdvancedReactors-GEIS Resource
Cc: Taylor, Robert; Monninger, John; Erwin, Kenneth; Beasley, Benjamin; Cushing, Jack; Sutton, Mallecia; GRP. Generation & Suppliers Internal Distribution List
Subject: [External_Sender] NEI Comments on Scoping of an Advanced Nuclear Reactor Generic Environmental Impact Statement [Docket ID: NRC-2020-0101]
Attachments: 06-30-2020_NRC_Industry Comments on Scoping of an Advanced Nuclear Reactor GEIS_with Attachments.pdf

THE ATTACHMENT CONTAINS THE COMPLETE CONTENTS OF THE LETTER

June 30, 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 Scoping of an Advanced Nuclear Reactor Generic Environmental Impact Statement [Docket ID: NRC-2020-0101]

Project Number: 689

The Nuclear Energy Institute (NEI) is pleased to provide comments on the scope of the NRC's proposed Advanced Nuclear Reactor (ANR) Generic Environmental Impact Statement (GEIS) [Docket ID: NRC-2020-0101].^[1] NEI supports the NRC's development of an ANR GEIS as a means of expediting the ANR licensing process while complying with the National Environmental Policy Act (NEPA). However, we believe the NRC's proposed scope for the ANR GEIS is too narrow to achieve optimal benefit to the industry and the NRC. We believe the following recommendations, if adopted, would lead to an ANR GEIS that encompasses a wide array of advanced nuclear technologies—thereby providing substantially more

^[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.

benefit—without greatly increasing the time and effort required to develop the ANR GEIS. Importantly, it would help meet the congressionally-mandated need for a “predictable, efficient, and affordable” licensing process for advanced reactors.

Marcus R. Nichol Senior Director, New Reactors

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Submitted via AdvancedReactors-GEIS.resource@nrc.gov

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The Nuclear Energy Institute (NEI) is pleased to provide comments on the scope of the NRC's proposed Advanced Nuclear Reactor (ANR) Generic Environmental Impact Statement (GEIS) [Docket ID: NRC-2020-0101].¹ NEI supports the NRC's development of an ANR GEIS as a means of expediting the ANR licensing process while complying with the National Environmental Policy Act (NEPA). However, we believe the NRC's proposed scope for the ANR GEIS is too narrow to achieve optimal benefit to the industry and the NRC. We believe the following recommendations, if adopted, would lead to an ANR GEIS that encompasses a wide array of advanced nuclear technologies—thereby providing substantially more benefit—without greatly increasing the time and effort required to develop the ANR GEIS. Importantly, it would help meet the congressionally-mandated need for a “predictable, efficient, and affordable” licensing process for advanced reactors.²

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 See Letter from U.S. Senators John Barrasso, Mike Crapo, Sheldon Whitehouse, and Cory Booker to NRC Chairman Kristine Svinicki (May 14, 2020) (reflecting Congress's expectation that “the NRC's regulatory framework will account for the innovative features of advanced nuclear technologies” and include “the rules to license and regulate these advanced nuclear technologies in a predictable, efficient, and affordable manner”).

A. A More Broadly-Scoped and Performance-Based ANR GEIS Is Essential to Meeting Critical Industry, NRC, and National Policy Objectives

The NRC ANR GEIS should be scoped to be as technology-inclusive as possible, and should not be exclusive to very small power levels (i.e., micro-reactors). As discussed in subsequent comments, an ANR GEIS that includes large advanced reactors could be developed using available agency resources, and would provide substantially more benefits as compared to a GEIS that is focused on only micro-reactors.

A more broadly-scoped ANR GEIS is consistent with the June 25, 2019 letter to NRC Chairman Svinicki from Senators John Barrasso and Mike Braun, which urged the NRC to develop an ANR GEIS as “a critical step to facilitate the deployment of new nuclear technologies.”³ They noted that “[a] GEIS is another important action that aligns with NEIMA’s [the Nuclear Energy Innovation and Modernization Act’s] advanced nuclear reactor requirements,” and “will reduce cumbersome regulatory barriers, expedite the environmental review process, and enable market deployment of innovative nuclear technologies.”⁴ Among other things, NEIMA directs the NRC to modify the licensing process for commercial “advanced nuclear reactor” facilities to enhance predictability and efficiency, while still ensuring adequate protection and public health and safety.⁵ Avoiding undue delays in the licensing process, including the agency’s NEPA review, is essential to fostering technological innovation in advanced nuclear reactors that have environmental benefits relative to other generation sources.⁶

Notably, Senators Barrasso and Braun did not distinguish between particular types or classes of ANRs or power levels in discussing the need for an ANR GEIS. Thus, an ANR GEIS that is narrowly focused and has very limited applicability to future applications would still necessitate the *de novo* preparation of an EIS for the vast majority of individual ANR applications. A broader more inclusive ANR GEIS is therefore needed to be consistent with Congress’s intent that “[a] GEIS for advanced nuclear reactors will demonstrate NRC’s commitment to transform and innovate.”⁷ In short, NRC’s development of a versatile ANR GEIS is a congressional and regulatory imperative.

³ Letter from Senators John Barrasso and Mike Braun to NRC Chairman Kristine Svinicki, at 1 (June 25, 2019).

⁴ *Id.* (emphasis added). Relatedly, Senators Barrasso and Braun noted that Executive Order (EO) 13807, “Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure,” 82 Fed. Reg. 40,463 (Aug. 15, 2017) and other laws, including the FAST Act (P.L. 114-94), focus on improving the environmental permitting process and coordinating agency environmental reviews to meet ambitious deadlines. *Id.* n.1.

⁵ Nuclear Energy Innovation and Modernization Act, P.L. 115-439 (Jan. 14, 2019), available at <https://www.congress.gov/bill/115th-congress/senate-bill/512>. The NEIMA defines “advanced nuclear reactor” broadly, without regard to a specific reactor type, technology or power level.

⁶ Letter from Senators John Barrasso and Mike Braun to NRC Chairman Kristine Svinicki, at 1 (June 25, 2019) (noting that an efficient and predictable NRC regulatory framework “will help nuclear innovators successfully deploy advanced nuclear technologies with enhanced performance and reduced risk”).

⁷ *Id.* (emphasis added).

B. Developing the ANR GEIS, the NRC Should Leverage the Environmental Analyses Performed for the Current Fleet of LWRs and Numerous Proposed Advanced LWRs

We believe that the NRC already has substantial information and analysis from which it can develop a GEIS that covers a wide range of ANR technologies, designs, and potential host sites. Specifically, the NRC has prepared extensive environmental impact analyses for the current light-water reactor (LWR) operating fleet and numerous advanced large LWR projects, one of which (Vogtle Units 3 and 4) is nearing completion. In developing NUREG-1437, the license renewal GEIS, the NRC performed an “extensive, systematic study of the potential environmental consequences of operating a nuclear power plant for an additional 20 years.”⁸ These evaluations demonstrate that large light-water reactors (LLWRs) in the range of 1,000 MW(e) result in minimal, and often beneficial, environmental impacts. The environmental impacts of ANRs are expected to be similar to, or bounded by, LLWRs. Environmental impact evaluations for LLWRs can and should be used as part of the basis for establishing a broad scope of the ANR GEIS.

When the NRC revised the GEIS in 2013, it did so “to update and reevaluate the potential environmental impacts arising from the renewal of an operating license for an additional 20 years.”⁹ In the process, the NRC drew from “[t]he lessons learned and the knowledge gained during previous license renewal environmental reviews, along with public comments received during previous reviews.”¹⁰ The result is a comprehensive assessment of the environmental impacts of large LWR operation based on hundreds of years of operating experience.¹¹ As summarized in Section S.5 of the 2013 GEIS, that assessment indicates that the impacts of operation are frequently small and, in some cases, beneficial for those resource areas analyzed generically across the LWR fleet. These analyses are further augmented by the numerous plant-specific supplements to the GEIS prepared for initial and subsequent license renewal applications.

The plant-specific EISs prepared by the NRC for ten advanced LWR combined license (COL) applications and five early site permit (ESP) applications provide another substantial body of detailed technical information and analysis from which the Staff should draw in developing an ANR GEIS. Attachment 1 summarizes the NRC’s environmental impact determinations for all resource areas analyzed for each of these COL/ESP projects based upon a review of the 15 EISs produced by the NRC staff. As shown therein, the estimated impacts—which reflect potential construction and operation impacts—are small to moderate (and in some cases beneficial) for most resource areas across the different sites analyzed by the NRC.

⁸ *Fla. Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 & 4), CLI-01-17, 54 NRC 3, 11 (2001) ((citing NUREG-1437, “Generic Environmental Impact Statement for License Renewal of Nuclear Plants,” Final Report, vol. 1 (May 1996)).

⁹ SECY-14-0016, “Ongoing Staff Activities to Assess Regulatory Considerations for Power Reactor Subsequent License Renewal,” Enclosure 1 at 1 (Jan. 31, 2014) (ML14050A306).

¹⁰ *Id.* at 1-2.

¹¹ NUREG-1437 assesses 92 environmental issues related to plant operation, 68 of which are deemed “Category 1” issues and are identified in 10 CFR Part 51 as not requiring additional plant-specific analysis.

In a related vein, NEI strongly encourages NRC to consider advanced reactor fuel cycle impacts in this ANR GEIS. Again, thinking of performance-based parameters, many potential impacts on both the front-end and back-end still could be enveloped by the LWR fuel cycle, the impacts of which the NRC has analyzed in detail. An ANR GEIS that includes advanced reactor fuel cycle environmental impacts would provide significant efficiencies for NRC reviewers and advanced reactor applicants.

C. The NRC Should Use Performance-Based, Consequence-Oriented Parameters Instead of Specific Deterministic Values in Developing the ANR GEIS

We believe that the NRC should take a performance-based and consequence-oriented approach to achieve a broadly-scoped ANR GEIS. Consistent with the foregoing recommendation, the NRC should avoid defining the scope of the GEIS to a very discrete subset of ANRs or on the basis of power level (i.e., "small-scale" ANRs on the order of 30-60 MW(t)). The NRC should also avoid relying on an arbitrarily defined "table of bounding values or parameters." Instead, the NRC should use performance-based parameters that are consequence-oriented and relate more directly to the potential environmental impacts of the construction and operation of an ANR. Performance-based parameters that are consequence-oriented would also encompass the broadest possible range of advanced reactor technologies (LWR and non-LWR).

Notably, this proposed approach is consistent with the recommendations in the aforementioned June 25, 2019 letter from Congress, which states that such a GEIS should:

- Acknowledge areas where common environmental impacts have already been effectively addressed in other elements of the NRC review;
- Acknowledge areas where issuance of other federal or state environmental permits can mitigate environmental impacts;
- Credit designs that minimize environmental impact due to the production, design, and safety features of advanced reactors; and
- Allow unique design or site challenges to be addressed using Supplemental Environmental Impact Statements.¹²

It also is consistent with observations made by the Staff in its recent response to NEI's March 2020 White Paper, "Recommendations for Streamlining Environmental Reviews for Advanced Reactors." Specifically, the Staff noted that it is engaged in a number of environmental review-related initiatives that "recognize the likely smaller environmental impacts that can arise from certain advanced reactor designs," including

¹² Letter from Senators John Barrasso and Mike Braun to NRC Chairman Kristine Svinicki, at 2 (June 25, 2019).

an “[e]valuation of the requirements in 10 CFR Part 51 to identify areas where flexibilities may be provided to better tailor the environmental review to the impacts associated with advanced reactor designs.”¹³

NEI recognizes that because many ANR technologies still are under development, their exact design features and specifications, as well as host sites, are not yet known. However, advanced reactors are being designed to further reduce the risk of offsite radiological impacts (e.g., through smaller source terms as well as new passive safety features and fuel designs).¹⁴ ANR designs also are expected to entail smaller construction-related impacts (e.g., due to smaller footprints and/or use of modular construction methods), consume less water, and generate less spent fuel.¹⁵ Additionally, potential environmental impacts can be mitigated or controlled through compliance with requirements and permits issued by other federal, state, and local agencies.¹⁶ Therefore, we believe that for most resource areas, the NRC can incorporate criteria and assumptions in an ANR GEIS that are sufficiently conservative to bound the environmental impacts of a wide range of ANR designs, such that variances that may occur between different technologies and sites are unlikely to result in impact determinations that are greater than those presented in the GEIS.¹⁷ Importantly, this analytical premise would not preclude the NRC from considering site-specific information and related impacts, as warranted, in its plant-specific supplements to the GEIS.

Attachment 2 provides examples of an alternative approach to the NRC’s Draft Plant and Site Parameter Envelopes that are performance-based and consequence-oriented.¹⁸ The use of performance-based criteria instead of deterministic (e.g., power level and land footprint) values is expected to substantially expand the scope and applicability of the ANR GEIS, thereby optimizing its benefits to the industry and the NRC. Such an approach is expected to require relatively little additional effort as compared to a deterministic approach based on power level. As suggested above, the approach reflected in Attachment 2 seeks to leverage the detailed environmental information and analyses documented in NUREG-1437 and the NRC’s site-specific COL and ESP environmental impact statements.

¹³ Letter from John R. Tappert, Director, Division of Rulemaking, Environmental, and Financial Support, NRC-NMSS, to Doug True, Sr. Vice President and Chief Nuclear Officer, Nuclear Energy Institute, at 1 (June 10, 2020).

¹⁴ *See, e.g.*, NEIMA Section 3.(1) (defining “advanced nuclear reactor” to include potential improvements such as additional inherent safety features; significantly lower levelized cost of electricity; lower waste yields; greater fuel utilization; enhanced reliability; increased proliferation resistance; increased thermal efficiency; and ability to integrate into electric and nonelectric applications).

¹⁵ *See, e.g.*, Nuclear Innovation Alliance, “Streamlining NRC NEPA Reviews for Advanced Reactor Demonstration Projects While Safeguarding Environmental Protection” at 19-20 (September 2019) <https://www.nuclearinnovationalliance.org/streamlining-nrc-nepa-reviews-advanced-reactor-demonstration-projects>.

¹⁶ This key principle is incorporated in the GEIS for license renewal. *See* NUREG-1437, Rev. 1 at 3-138 (“Nuclear power plants are required by the NRC to operate in compliance with all applicable environmental laws, regulations, and permits, therefore minimizing the impact on the environment, workers, and the public.”).

¹⁷ *See, e.g.*, ClearPath White Paper, “Appendix A – Preliminary Assessment of Major Categories of Environmental Impact” and “Appendix B – Key Factors Driving Generic Treatment of Advanced Nuclear Reactors.”

¹⁸ NRC Staff Presentation, “Scoping Meeting Small-Scale Advanced Reactor Generic Environmental Impact Statement (GEIS)” (May 28, 2020) (ML20147A677).

D. NEI's Recommendations for Developing a More Broadly-Scoped and Performance-Based ANR GEIS Are Consistent with NEPA Requirements and Related Legal Principles

The NRC's development of a GEIS that generically evaluates the environmental impacts associated with a broad range of ANR designs is entirely permissible under NEPA.¹⁹ To realize the full value of an ANR GEIS, it should be codified in a rulemaking so that it can be relied upon by the future ANR license applications. The U.S. Supreme Court has underscored the NRC's broad discretion to structure its NEPA inquiries, and found that when there are environmental effects that would be essentially similar for all or a commonly identifiable subcategory of nuclear plants, "[a]dministrative efficiency and consistency of decision are both furthered by a generic determination of these effects."²⁰ The First Circuit similarly has noted, in the context of NRC license renewal, that the NRC's "divergent treatment of generic and site-specific issues is reasonable and consistent with the purpose of *promoting efficiency* in handling [its licensing] decisions."²¹ The NRC's established use of GEISs and associated Part 51 rulemakings, particularly in the LWR license renewal and spent fuel continued storage contexts, underscores the viability and efficacy of the generic analysis method under NEPA.²²

NEI's recommendations that the NRC develop performance-based, consequence-oriented parameters and apply bounding assumptions based on previous agency NEPA analyses also are consistent with established NEPA principles. As an initial matter, agencies are allowed to select their own methodology so long as that methodology is reasonable.²³ It also is settled law that NEPA requires an agency to provide only "a reasonably thorough discussion of the *significant* aspects of the *probable environmental consequences*" of a proposed action.²⁴ "NEPA also does not call for certainty or precision, but an *estimate* of anticipated (not unduly speculative) impacts"²⁵ that is based on the "best information available now."²⁶ Nor does NEPA

¹⁹ *Balt. Gas & Elec. Co. v. NRDC*, 462 U.S. 87, 101 (1983) ("The generic method chosen by the agency is clearly an appropriate method of conducting the hard look required by NEPA.") See also *Massachusetts v. United States*, 522 F.3d 115, 127 (1st Cir. 2008); *Massachusetts v. NRC*, 708 F.3d 63, 68 (1st Cir. 2013); *NRDC v. NRC*, 823 F.3d, 641, 653 (D.C. Cir. 2016).

²⁰ *Balt. Gas*, 462 U.S. at 101 (citations omitted). See also *Minnesota v. NRC*, 602 F.2d 412 (D.C. Cir. 1979).

²¹ *Massachusetts*, 522 F.3d at 119-120, 127 (1st Cir. 2008) (emphasis added). See also 40 CFR § 1502.4 (noting that agencies may evaluate actions generically based on "relevant similarities, such as common timing, impacts, alternatives, methods of implementation, media, or subject matter").

²² To date, the NRC has prepared GEIS documents for at least five types of conditions or activities: (1) the relicensing of nuclear power plants, (2) the handling and storage of spent nuclear reactor fuel, (3) the decommissioning of nuclear facilities, (4) in support of rulemaking on radiological criteria for license termination, and (5) in-situ uranium recovery facilities.

²³ *Entergy Nuclear Generation Co. (Pilgrim Nuclear Power Station)*, CLI-10-11, 71 NRC 287, 316 (2010) (quoting *Town of Winthrop v. FAA*, 535 F.3d 1, 11-13 (1st Cir. 2008)).

²⁴ *WildEarth Guardians v. Mont. Snowmobile Ass'n*, 790 F.3d 920, 924 (9th Cir. 2015) (quoting *City of Sausalito v. O'Neill*, 386 F.3d 1186, 1206 (9th Cir. 2004)) (emphasis added).

²⁵ *La. Energy Servs., L.P. (Nat'l Enrichment Facility)*, CLI-05-20, 62 NRC 523, 536 (2005).

require an agency to undertake studies to obtain information that is not already available, or “to determine the cause of particular environmental conditions or to determine the best mitigation measures for a potential environmental harm.”²⁷ And, “[u]nder basic NEPA principles, it is reasonable to tailor the degree of mitigation analysis to the significance of the impact to be mitigated.”²⁸ Finally, the NRC may use “conservative bounding assumptions” to “generically analyze risks [or impacts] that are essentially common to all plants so long as that analysis is thorough and comprehensive.”²⁹

Again, if the NRC adopts the industry’s recommendations and develops a broader, technology-inclusive ANR GEIS, and codifies its ANR GEIS findings via rulemaking, it still would have the ability to perform any necessary site-specific analyses in plant-specific supplements to the GEIS. This is precisely the approach that the NRC has used in the LWR license renewal context, with the approval of the federal courts. This approach, moreover, would still permit the NRC to undertake the cost-benefit analysis required under NEPA for new reactor applications—i.e., to determine, after weighing the environmental, economic, technical, and other benefits against environmental and other costs, and considering reasonable alternatives, whether the ANR license/permit/authorization should be issued, denied, or appropriately conditioned to protect environmental values.³⁰

NEI notes that in its February 2019 White Paper, ClearPath suggested a framework and methodology for the generic treatment of key EIS components, as identified in NRC regulations and NRC’s Environmental Standard Review Plan (NUREG-1555).³¹ That framework, when combined with the recommendations and information presented herein (including Attachments 1 and 2), provides a useful starting point for the NRC’s preparation of a more versatile ANR GEIS. By fully leveraging prior NRC environmental analyses and using performance-based criteria, that GEIS could generically address many common environmental impacts for a much broader range of ANR technologies than is currently proposed by the NRC.

²⁶ *Entergy Nuclear Generation Co.* (Pilgrim Nuclear Power Station), CLI-12-15, 75 NRC 704, 726 (2012) (citations omitted).

²⁷ *Fla. Power & Light Co.* (Turkey Point Nuclear Generating Units 3 and 4), CLI-16-18, 84 NRC 167, 173 (2016).

²⁸ *Entergy Nuclear Operations, Inc.* (Indian Point, Units 2 and 3), CLI-16-7, 83 NRC 293, 323 n.156 (2016).

²⁹ *New York v. NRC*, 824 F.3d 1012, 1019 (D.C. Cir. 2016) (internal quotation marks and citation omitted).

³⁰ See 10 CFR § 51.107(a)(3). See, e.g., Summary of Record of Decisions, U.S. Nuclear Regulatory Commission, Docket No. 52-033, Combined License Application for Enrico Fermi Nuclear Plant Unit 3 (May 1, 2015) (ML15120A221).

³¹ ClearPath, “White Paper: Advocating the Use of Generic Environmental Impact Statements in Support of the Construction and Operation of Advanced Nuclear Reactors” (Feb. 2019).

Program Management, Announcements and Editing Staff

June 30, 2020

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If you have questions concerning this letter or the attached comments, please contact me or Kati Austgen (202.739.8068 or kra@nei.org).

Sincerely,

A handwritten signature in black ink, appearing to read "Marcus Nichol". The signature is fluid and cursive, with a prominent initial "M" and a long, sweeping tail.

Marcus Nichol

Attachments

C: Robert M. Taylor, NRC/NRR
John D. Monninger, NRC/NRR/DANU
Kenneth T. Erwin, NRC/NMSS/REFS/ERNRB
Benjamin G. Beasley, NRC/NRR/DANU/UARL
Jack S. Cushing, NRC/NMSS/REFS/ERNRB
Mallecia A. Sutton, NRC/NRR/DANU/UARL

Environmental Impact Statement Resource Impact Summary

This attachment summarizes the NRC’s environmental impact determinations for all resource areas analyzed for each of the plant-specific EISs prepared by the NRC for ten advanced LWR combined license (COL) applications and five early site permit (ESP) applications based upon a review of the 15 EISs produced by the NRC staff. This provides another substantial body of detailed technical information and analysis from which the Staff should draw in developing an ANR GEIS. The estimated impacts—which reflect potential construction and operation impacts—are small to moderate (and in some cases beneficial) for most resource areas across the different sites analyzed by the NRC. In the case of the five ESP applications, none of the limited moderate or large potential impacts identified by the NRC staff led it to conclude that there were environmentally preferable or obviously superior alternative sites. Thus, in each case, the NRC staff recommended issuance of the ESP in its EIS. With regard to each of the ten COL applications, the NRC staff found that the construction and operation of the proposed new reactors, with mitigation measures identified by the staff, would accrue benefits that most likely would outweigh the economic, environmental, and social costs associated with the proposed reactors (including some limited moderate or large environmental impacts). Therefore, the NRC staff recommended COL issuance in each of its supporting EISs.

Table 1

Plant	Land Use	Water Use	Water Quality	Terrestrial and Wetland Resources	Aquatic Ecology	Physical	Demography	Community Economics
Fermi 3 COL	Table 10-1 Pg 473 NUREG-2105	SMALL	SMALL	SMALL TO MODERATE	SMALL	SMALL	Not Adverse. Impact is beneficial	Not Adverse. Impact is beneficial
Lee 1 & 2 COL	Pg 330 NUREG-2111	SMALL	SMALL	SMALL TO MODERATE	SMALL	SMALL	SMALL	SMALL
North Anna COL	Table 4-1 Pg 204 NUREG-1811	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL
Turkey Point COL	Table 4-18 Pg 491	MODERATE	SMALL	MODERATE	SMALL TO MODERATE	SMALL TO MODERATE	SMALL	SMALL

Environmental Impact Statement Resource Impact Summary

Table 1		Plant	Land Use	Water Use	Water Quality	Terrestrial and Wetland Resources	Aquatic Ecology	Physical	Demography	Community Economics
	NUREG-2176									
Clinch River ESP NUREG-2226	Table 4-14 Pg 363 NUREG-2226	MODERATE	SMALL	SMALL	SMALL	MODERATE	SMALL	SMALL TO MODERATE	SMALL	SMALL (beneficial)
Exelon ESP	Table 4-1 Pg 199 NUREG-1815	SMALL	SMALL	SMALL	SMALL	Unresolved, likely to be SMALL	SMALL	SMALL	SMALL	Beneficially SMALL TO MODERATE
Grand Gulf ESP	Table 4-3 Pg 229 NUREG-1817	Unresolved likely to be SMALL	Unresolved likely to be SMALL	Unresolved likely to be SMALL	Unresolved likely to be SMALL	Unresolved, likely to be MODERATE	SMALL	SMALL	LARGE	Beneficially LARGE
Calvert Cliffs 3 COL	Table 4-11 Pg 400 NUREG-1936	SMALL	SMALL	SMALL	SMALL	MODERATE - NRC authorized construction impact level is SMALL	MODERATE - NRC authorized construction impact level is SMALL			
VC Summer COL	Table 4-8 Pg 388 NUREG-1939	SMALL	SMALL	SMALL	SMALL	MODERATE - NRC authorized construction impact level is SMALL	SMALL	SMALL	SMALL	SMALL
Levy 1 & 2 COL	Table 10-1 Pg 453	MODERATE - NRC authorized construction	SMALL	SMALL	SMALL	MODERATE - NRC authorized construction	SMALL	MODERATE - NRC authorized construction	SMALL	Beneficially SMALL TO MODERATE

Environmental Impact Statement Resource Impact Summary

Table 1		Plant	Land Use	Water Use	Water Quality	Terrestrial and Wetland Resources	Aquatic Ecology	Physical	Demography	Community Economics
	NUREG-1941	impact level is SMALL				impact level is SMALL		impact level is SMALL		
Comanche Peak 1&2 COL	Table 4-15 Pg 306 NUREG-1943	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL TO MODERATE	SMALL TO MODERATE	Beneficially SMALL TO LARGE
PSEG ESP	Table 4-22 Pg 395 NUREG-2168	MODERATE	SMALL	SMALL	SMALL	MODERATE	SMALL	SMALL TO MODERATE	SMALL	Beneficially SMALL TO MODERATE
Bell Bend COL	Table 4-14 Pg 459 NUREG-2179	SMALL	SMALL	SMALL	SMALL	MODERATE	SMALL	SMALL	SMALL	Beneficially SMALL TO MODERATE
STPNOC COL	Table 4-7 Pg 369 NUREG-1937	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL TO MODERATE	Beneficially SMALL TO MODERATE
Vogtle 3&4 ESP & COL ²	Table 4-7 Pg 4-75 NUREG-1872 Section 4.12 Pg 433 NUREG-1947	Site and Vicinity - SMALL Transmission Line and Off-site Areas - MODERATE	SMALL	SMALL	SMALL	SMALL TO MODERATE (the moderate portion was new transmission line construction)	SMALL	SMALL TO MODERATE (the moderate portion was new transmission line construction)	SMALL TO MODERATE	Beneficially SMALL TO MODERATE

Environmental Impact Statement Resource Impact Summary

Table 2		Plant	Infrastructure & Services	Enviro. Justice	Historic & Cultural Resources	Air Quality	Non-radiological Health	Radiological Health	Fuel Cycle (incl. rad. waste), Transport. & Decomm.	Non-radioactive Waste
Fermi 3 COL	Table 10-1 Pg 473 NUREG-2105	SMALL TO MODERATE	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL
Lee 1 & 2 COL	Pg 330 NUREG-2111	SMALL TO MODERATE	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL
North Anna COL	Table 4-1 Pg 204 NUREG-1811	SMALL TO MODERATE	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL
Turkey Point COL	Table 4-18 Pg 491 NUREG-2176	SMALL TO MODERATE	NONE	MODERATE	SMALL	SMALL	SMALL	SMALL	N/A	SMALL
Clinch River ESP NUREG-2226	Table 4-14 Pg 363 NUREG-2226	SMALL (MOD-LARGE for traffic)	NONE	MODERATE TO LARGE	SMALL	SMALL TO MODERATE	SMALL	SMALL	N/A	SMALL
Exelon ESP	Table 4-1 Pg 199 NUREG-1815	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL		
Grand Gulf ESP	Table 4-3 Pg 229 NUREG-1817	MODERATE	Beneficially LARGE	SMALL	SMALL	SMALL	SMALL	SMALL		
Calvert Cliffs 3 COL	Table 4-11 Pg 400 NUREG-1936		SMALL	LARGE - NRC authorized construction impact is SMALL	SMALL	SMALL	SMALL	SMALL		SMALL

Environmental Impact Statement Resource Impact Summary

Table 2		Plant	Infrastructure & Services	Enviro. Justice	Historic & Cultural Resources	Air Quality	Non-radiological Health	Radiological Health	Fuel Cycle (incl. rad. waste), Transport. & Decomm.	Non-radioactive Waste
VC Summer COL	Table 4-8 Pg 388 NUREG-1939	MODERATE TO SMALL	MODERATE TO SMALL	MODERATE - NRC authorized construction impact level is SMALL	MODERATE - NRC authorized construction impact level is SMALL	MODERATE - NRC authorized construction impact level is SMALL	SMALL	SMALL		SMALL
Levy 1 & 2 COL	Table 10-1 Pg 453 NUREG-1941	SMALL TO MODERATE	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL		SMALL
Comanche Peak 1&2 COL	Table 4-15 Pg 306 NUREG-1943	SMALL TO MODERATE	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL		SMALL
PSEG ESP	Table 4-22 Pg 395 NUREG-2168	SMALL TO MODERATE	NONE	SMALL TO MODERATE	SMALL TO MODERATE	SMALL	SMALL	SMALL		SMALL
Bell Bend COL	Table 4-14 Pg 459 NUREG-2179	SMALL TO MODERATE	NONE	SMALL	SMALL	SMALL	SMALL	SMALL		SMALL
STPNOC COL	Table 4-7 Pg 369 NUREG-1937	SMALL TO MODERATE	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL		SMALL
Vogtle 3&4 ESP & COL ²	Table 4-7 Pg 4-75 NUREG-1872 Section 4.12 Pg 433	SMALL TO MODERATE (Transportation due to construction traffic and	SMALL	MODERATE	MODERATE	SMALL	SMALL	SMALL		SMALL

Environmental Impact Statement Resource Impact Summary

Table 2										
Plant	Infrastructure & Services	Enviro. Justice	Historic & Cultural Resources	Air Quality	Non-radiological Health	Radiological Health	Fuel Cycle (incl. rad. waste), Transport. & Decomm.	Non-radioactive Waste		
NUREG-1947	V1&2 Outages without mitigation)									

Performance Based Proposal

This attachment offers a starting point for consideration to develop the NRC’s ANR GEIS framework of draft parameters using performance criteria that are consequence-oriented and relate more directly to the potential environmental impacts in a Plant Parameter Envelope or Site Parameter Envelope. Performance-based parameters that are consequence-oriented would also encompass the broadest possible range of advanced reactor technologies. Additionally, this is consistent with the recommendations in the June 2019 letter from Congress, which stated that such a GEIS should:

- Acknowledge areas where common environmental impacts have already been effectively addressed in other elements of the NRC review;
- Acknowledge areas where issuance of other federal or state environmental permits can mitigate environmental impacts;
- Credit designs that minimize environmental impact due to the production, design, and safety features of advanced reactors; and
- Allow unique design or site challenges to be addressed using Supplemental Environmental Impact Statements.¹

The first three goals, above, can be characterized as principles that form the underlying basis for each parameter’s performance criterion:

- a) Performance is demonstrated by meeting other elements of the NRC requirements/review, e.g., environmental impact effectively addressed in the NRC safety review.
- b) Performance is demonstrated by meeting requirements of local, State, and other Federal regulations and permits, i.e., for a permit to be issued, the subject of that permit must meet applicable regulations (Clean Water Act, Clean Air Act, etc.) and is therefore considered to have small environmental impact.
- c) Performance is demonstrated through advanced reactor features that maintain environmental impacts similar to, or bounded by, large light water reactors, e.g., design minimizes environmental impact due to the production, design, and/or safety features; NUREG-1437 basis applies or can be scaled.

In the following tables, for each parameter’s basis we have identified an associated principle (a, b, c), as appropriate.

Parameter	Criteria for Category 1 Finding	Basis
Site Considerations	<ol style="list-style-type: none"> 1. Site size meets NRC siting regulations 2. The site is <ol style="list-style-type: none"> a. a designated portion of a government reservation, military base, existing power plant site, or other existing site in industrial use, or 	<p>(a, c) Criteria 1, 2a, 3, and 4 are the same as NRC assumptions with minor editorial changes to fit the new structure.</p> <p>Criteria 1b is modified from the NRC assumptions about stand-alone sites. A site size was added based on the discussion in NUREG-1437 about the size of existing LWR sites. 1000</p>

¹ Letter from Senators John Barrasso and Mike Braun to NRC Chairman Kristine Svinicki, at 2 (June 25, 2019).

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Parameter	Criteria for Category 1 Finding	Basis
	<ul style="list-style-type: none"> b. stand alone and would encompass less than 1000 acres.² 3. Complies with applicable zoning 4. Not inconsistent with any comprehensive plans or other land use plans 5. Land cover land use is consistent with other local, State or other Federal requirements 	<p>acres falls in the middle of the range of sites for existing LWRs.</p> <p>Criteria 5 is added based on the discussion in NUREG-1437 about land use.</p>
Permanent Footprint of Disturbance	<ul style="list-style-type: none"> 1. Not located on prime farmland 2. Not located on wetlands, floodplains, surface water features, riparian habitat, climax or old-growth vegetation, or dedicated conservation land 	<p>(a) Same as NRC assumptions, except for removal of constraint on siting adjacent to actively used farmland. A nuclear facility could be located adjacent to certain sensitive lands if the facility has acceptable offsite radiological impacts. This will be bounded by/consistent with the safety analysis.</p>
Temporary Footprint of Disturbance	<ul style="list-style-type: none"> 1. Restored to original grade and seeded or planted with indigenous vegetation once construction is complete. 2. Meets criteria for permanent footprint. 3. The area is bounded by the total site area. 	<p>(c) 1 and 2 same as NRC assumptions.</p> <p>3 is an extension of NUREG-1437 which discusses the bounds of the footprint.</p>
Offsite right-of-way	<ul style="list-style-type: none"> 1. Does not cross or pass adjacent to parks, wildlife refuges, or conservation lands. 2. Does not cross Wild and Scenic River or National Heritage River, or river of similar state designation. 3. Provides right-of-way that is: <ul style="list-style-type: none"> a. Within or adjacent to an existing right-of-way, or b. No larger than 1000 ft x 100 ft for a new offsite right-of-way 	<p>(b) Needs further development of performance-based criteria for size of new offsite right-of-way.</p>
Cooling and Service Water Intake	<p>Operates within local, State, and other Federal regulations and permits.</p>	<p>(b) Meeting local, State, and other Federal regulations and permits is considered to have small environmental impact as it achieves:</p>

² NUREG-1437 states that 60% of the licensed LWRs use sites that are between 500-2000 acres.

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Parameter	Criteria for Category 1 Finding	Basis
		<ol style="list-style-type: none"> 1. Is water cooled and will not affect ground or surface water quality. 2. Is not water cooled and will either: <ol style="list-style-type: none"> a. not use surface water, or b. will use surface water but will not affect ground or surface water quality
Consumptive water use	<p>No analysis needed. NUREG-1437 has already concluded consumptive water use would have a small environmental impact and advanced reactors are expected to use less water than existing LWRs.</p> <p>OR, if some criteria are necessary:</p> <ol style="list-style-type: none"> 1. The reactor is water cooled and: <ol style="list-style-type: none"> a. the consumptive use is 40% or less of the total water used for cooling and service water, and b. will have a negligible effect on surface water quality. 2. The reactor is not water cooled. 	(c) Consumptive water sources include surface water, groundwater, and domestic water. NUREG-1437 found that consumptive use of water is dominated by cooling systems (for LWRs) with all other consumptive uses negligible by comparison. Extending that logic, advanced reactors that are not water cooled would be bounded with substantial margin by LWRs. NUREG-1437 also found that consumptive water use due to cooling systems was a small environmental impact. By extension, water cooled advanced reactors designed to use water efficiently and in proportion to their cooling water usage would also be bounded by LWRs.
Plant water discharge	<ol style="list-style-type: none"> 1. The site operates under the Clean Water Act and associated permits. 	<p>(b) Slight modification of NRC assumption wording to clarify "permits."</p> <p>Advanced reactors will operate within local, State, and other Federal regulations and permits.</p>
Blowdown Temperature and Constituent Concentrations	<ol style="list-style-type: none"> 1. The site operates under the Clean Water Act and associated permits. 	<p>(b) Slight modification of NRC assumption wording to clarify "permits."</p> <p>Advanced reactors will operate within local, State, and other Federal regulations and permits.</p>
Potable and sanitary water use and discharge	<ol style="list-style-type: none"> 1. If groundwater is used, pumping rates fall within permissible limits. 	(b) No change from NRC assumptions.

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Parameter	Criteria for Category 1 Finding	Basis
	2. If municipal water and sewage is used, the amount used is available and within the capacity of the system.	Advanced reactors will operate within local, State, and other Federal regulations and permits.
Emissions from construction equipment and standby power equipment during operation	1. Criteria pollutants are less than Clean Air Act <i>de minimis</i> levels.	(b) No change from NRC assumptions. Advanced reactors will operate within local, State, and other Federal regulations and permits.
Megawatts thermal	Bounded by the safety analysis	(a)
Operational life for which the plant is designed	Bounded by the safety analysis	(a)
Building height	Less than the meteorology tower	Viewshed: what is the basis of NRC's review? Need to factor in non-safety buildings at the site which may be office buildings.
Foundation embedment	Consistent with the safety analysis.	(a, c) NUREG-1437 ties foundation embedment to geologic and soil conditions.
Construction workers	No analysis needed. There is no attribute for the site that would constitute a demonstrably greater environmental impact due to construction workers as compared to prior LWR construction.	(c, b) There is no indication that an advanced reactor site would not be bounded by the considerations in NUREG-1437. There is no reasonably foreseeable circumstance by which the environmental impacts of an advanced reactor site would be greater than that of an existing LWR site. Further, advanced reactor construction would comply with local building and transportation requirements.
The number of total permanent staff to support operations	No analysis needed. There is no attribute for the site that would constitute a demonstrably greater environmental impact due to operations workers as compared to prior LWR operation.	(c, b) There is no indication that an advanced reactor site would not be bounded by the considerations in NUREG-1437. There is no reasonably foreseeable circumstance by which the environmental impacts of an advanced reactor site would be greater than that of an existing LWR site. Further, advanced reactor construction would comply with local building and transportation requirements.

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Parameter	Criteria for Category 1 Finding	Basis
The additional number of temporary staff for refueling or maintenance outages	No analysis needed. There is no attribute for the site that would constitute a demonstrably greater environmental impact due to outage workers as compared to prior LWR outages.	<p>(c, b) Advanced reactor outages are expected to be bounded – with margin – as compared to existing LWRs. Also, a site that uses online refueling would minimize outages for refueling or other maintenance compared to the existing fleet of LWRs or other reactor designs. Thereby surges of temporary workers would be minimal.</p> <p>There is no indication that an advanced reactor site would not be bounded by the considerations in NUREG-1437. There is no reasonably foreseeable circumstance by which the environmental impacts of an advanced reactor site would be greater than that of an existing LWR site.</p> <p>Further, advanced reactor construction would comply with local building and transportation requirements.</p>
Noise generation	Construction is conducted within local noise requirements.	<p>(b, c) There is no unique noise effect of nuclear power compared to alternative energy sources for a proposed site. Most energy sources have the same affects with respect to noise both for operation, construction, and commuter traffic. This is notable in NUREG-1437. Noise is not a significant distinguishing feature in the evaluation of alternatives given that the basis of the project is a need for energy generation.</p>
Station Capacity Factor	Bounded by the safety analysis	(a) It is not reasonably foreseeable that an advanced reactor would be designed to operate at a capacity factor that is very low compared to alternative energy sources.
The normal plant operating cycle	Bounded by the safety analysis	(a)
Electrical output in mega-watt-electric MW(e)	Bounded by the safety analysis	(a) Not only is this parameter bounded by the safety analysis, but some applications may not be for

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Parameter	Criteria for Category 1 Finding	Basis
		electrical output rendering this parameter irrelevant.
Water for Sanitary and Potable Water Uses	<ol style="list-style-type: none"> 1. If groundwater is used, pumping rates fall within permissible limits and the aquifer supplying water must support the required amount at a rate that is sustainable and does not impact offsite uses or users 2. If municipal water supply is used, usage amount is available and within capacity of the system 3. Sanitary discharge to sewage treatment plant is within available capacity and permissible. The plant is allowed to hook up to municipal water and sewage system with sufficient capacity. 	(b) Same as original NRC assumptions. If used generically without specific values, these are performance-based.
Surface Water-Availability	<ol style="list-style-type: none"> 1. The plant is not water cooled. 2. If the plant is water cooled: <ol style="list-style-type: none"> a. Water availability is demonstrated by state-issued withdrawal permit b. Withdrawals do not prevent the maintenance of applicable instream flow requirements c. Water rights are obtainable, if needed, and amount is available without impact to other uses and users. d. Coastal Zone Management Act consistency determination obtained 	<p>(b, c) Same as original NRC assumptions with the exception of Criteria 1 which was slightly reworded to be parallel with other parameters in this table.</p> <p>Original NRC assumption for 1: "Not applicable if plant is air-cooled."</p> <p>This list also removes the NRC assumption: "Maximum average plant water withdrawals are less than 3% of minimum monthly flow of water body." Advanced Reactors will operate within local permitting requirements.</p> <p>From NUREG-1437: Large water bodies such as the oceans, Great Lakes are presumed to have sufficient water availability</p>
Surface Water - Discharge	<ol style="list-style-type: none"> 1. The plant is not water cooled. 2. If the plant is water cooled: <ol style="list-style-type: none"> a. Discharge is in accordance with state/local permits 	<p>(b, c) These criteria are the same as the NRC assumptions with a few exceptions:</p> <p>Criteria 1 was changed from "not applicable if the plant is air-cooled" to the broader criteria stated here.</p>

Parameter	Criteria for Category 1 Finding	Basis
	<p>b. Altered current patterns and salinity gradients would be localized.</p>	<p>Removed the NRC assumption that stated: "Maximum average plant discharge is small in comparison to monthly minimum flow of water body (<3%) and thermal and chemical components within the discharge would be diluted quickly." Advanced Reactors will operate within local permitting requirements.</p> <p>NUREG-1437 found that consumptive use of water is dominated by cooling systems (for LWRs) with all other consumptive uses negligible by comparison. Extending that logic, advanced reactors that are not water cooled would be bounded – with substantial margin – by LWRs. NUREG-1437 also found that consumptive water use due to cooling systems was a small environmental impact. By extension, water cooled advanced reactors designed to use water efficiently and in proportion to their cooling water usage would also be bounded by LWRs.</p> <p>Also, from NUREG-1437: "Large water bodies such as the oceans, Great Lakes are presumed to have sufficient water capacity for dilution as long as restrictions on localized impacts are met."</p>
<p>Groundwater – Availability and Quality</p>	<ol style="list-style-type: none"> 1. The plant is not water cooled. 2. If the plant is water cooled: <ol style="list-style-type: none"> a. Pumping rate is sustainable, is a small percent of flow within the aquifer and does not impact availability to offsite uses and users b. Withdrawal rates are within limits which are permissible by applicable state or local agencies 	<p>(b, c) Same as original NRC assumptions with the exception of Criteria 1 which was added. If a plant is not water cooled, then groundwater availability and quality is not a factor based on the NUREG-1437 finding that cooling systems are the dominant water use at existing LWR sites.</p>

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Parameter	Criteria for Category 1 Finding	Basis
	c. Groundwater usage does not impact quality within the aquifer.	
Air quality	Analysis not needed.	(b, c) The Clean Air Act requires certain limitations on the release criteria air pollutants. NUREG-1437 found that air quality impacts from operations and refurbishment activities would be small. Advanced reactors will operate within local, State, and other Federal regulations and permits.
Economics	Analysis not needed.	(b, c) An economic decision will already be made by an applicant; for applications subject to State economic regulators, the NRC needs consider that authorities' jurisdiction. In all cases NRC should forego significant analysis of the economic impact. Additionally, existing large LWRs have had predominantly positive socioeconomic impacts. Any impact from advanced reactors is expected to be bounded by existing LWRs.

Likely Category 2 Issues identified by NRC

In the May 28, 2020 NRC public meeting on ANR GEIS scoping, NRC staff posed the following for further consideration: "What aspects of these issues can be generically addressed?" We believe that all but two of the issues NRC identified (i.e., Endangered Species, and Historic and Cultural Resources) can be generically address as Category 1 issues as indicated below. Although there is a site-specific, perhaps technology-specific, component to the final determination on the issues NRC identified as "likely Category 2," which would need to be articulated in a supplemental EIS, NRC should work with stakeholders to identify performance-based criteria that applicants could use demonstrate they've met an ANR GEIS finding for the following:

Parameter	Criteria for Category 2 Finding	Basis
Endangered Species	The site complies with the Endangered Species Act.	(b) Advanced reactors will operate within local, State, and other Federal regulations and permits.
Historic and Cultural Resources	The site complies with the National Historic Preservation Act	(b) Advanced reactors will operate within local, State, and other Federal regulations and permits.

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Parameter	Criteria for Category 2 Finding and other Federal, State, and local requirements.	Basis
Severe Accidents/severe accident mitigation	Bounded by the safety analysis (Should be Category 1)	(a) Not necessary due to the requirement for applicants to have a PRA.
Climate Change	No analysis needed. (Should be Category 1)	(b, c) Not necessary due to the net positive impact of nuclear energy on avoiding climate changing emissions. Any impact from advanced reactors is expected to be bounded by existing LWRs.
Alternatives	Bounded by applicant description of the process used to select the site. (Should be Category 1)	See March 2020 NEI White Paper, "Recommendations for Streamlining Environmental Reviews for Advanced Reactors," recommendation 4.5.
Need for Project	Bounded by applicant description. (Should be Category 1)	See March 2020 NEI White Paper, "Recommendations for Streamlining Environmental Reviews for Advanced Reactors," recommendation 4.5.
Cost and Benefit	Bounded by applicant description. (Should be Category 1)	See March 2020 NEI White Paper, "Recommendations for Streamlining Environmental Reviews for Advanced Reactors," recommendation 4.5.