



Recommendations for Streamlining Environmental Reviews for Advanced Reactors

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Executive Summary

This report provides an assessment of opportunities to streamline environmental reviews for advanced nuclear reactors.¹ Since its inception, the National Environmental Policy Act (NEPA) has been governed by a “rule of reason” and thus required analyses that are focused on reasonably foreseeable actions and impacts—i.e., those that are likely to occur or are probable—rather than those that are merely possible or speculative. This is in keeping with NEPA’s original intent to inform agency decisions on federal actions based on an assessment of their likely environmental impacts. Additionally, pursuant to 40 CFR 1501.7(a)(3), NEPA documents are intended to “identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (40 CFR § 1506.3), narrowing the discussion of these issues in the statement [EIS] to a brief presentation of why they will not have a significant effect on the human environment or providing a reference to their coverage elsewhere.” Over time, however, agency implementation of NEPA has become unjustifiably complex and time-intensive, with reviews frequently spanning several years or more and requiring massive resource expenditures. Thus, maintaining the status quo likely will hinder the timely licensing of the advanced reactors under development, contrary to critical national energy security and environmental objectives.

Current U.S. Nuclear Regulatory Commission (NRC) regulations explicitly require that an environmental impact statement (EIS)—the most detailed of all NEPA review documents—be developed for virtually all new siting, construction, and operation applications. The current applicable regulations, which have not been substantively updated in many years, do not account for the inherent safety of advanced reactor designs and environmental benefits, including reduced use of materials and land, use of brownfield sites, reduced source terms, and the potential for reduced generation of spent nuclear fuel. For these reasons, it is imperative that the NRC and industry consider ways to optimize efficiencies in the environmental review process now, as advanced nuclear energy designs provide increased opportunities for providing power to remote locations, process heat for industrial applications, and integration with renewables.

Based on lessons learned from past licensing activities and the novel design features of the advanced reactors, this paper sets forth six recommendations to streamline the NRC’s implementation of NEPA, including actions to improve pre-application meetings, site audits, the efficiency of NRC requests for additional information, and inter-agency consultations. The following recommendations described in this report are supported by case law, precedent set by other agencies, and specific examples:

1. Revise 10 CFR 51.20 to eliminate the list of NRC licensing actions that require an EIS and allow for the flexibility to use environmental assessments (EAs) and categorical exclusions for those licensing actions.
2. Increase the use of generic environmental impact statements (GEISs) to address issues and impacts that are expected to be common to most, if not all, advanced reactor designs.
3. Strengthen the regulations and guidance to require NRC staff to review and incorporate existing environmental analyses into a project’s EA or EIS.

¹ The term “advanced reactor” is used broadly to encompass passively safe, light-water and non-light water reactors, small modular reactors and micro-reactors. Further, the principles of this paper may also be applied to new large-light water reactor applications.

4. Incorporate into NRC regulations the flexibility to use the applicant's environmental report (ER) as the basis for the draft EA or EIS.
5. Reduce burdensome alternative site analyses by limiting the scope of these analyses to those that are realistic and within the NRC's jurisdiction.
6. Increase the efficiency of environmental reviews through targeted process improvements.

Additional aspects of the licensing review were examined as a part of this effort with the intent of streamlining environmental reviews. The report identifies the need for better planning, early communication, and schedule adherence. The report examines and recommends improvements to the practices associated with the environmental audits, the process for NRC staff's requests for additional information (RAIs), and consultation with other agencies.

Finally, this report concludes that NRC reviews can be expedited and made less costly by implementing common practices used by other agencies, updating current regulations to reflect the recommendations, and performing environmental reviews that are commensurate with these innovative reactor designs.

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List of Acronyms and Abbreviations

ANPRM	Advance Notice of Proposed Rulemaking
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
COL	Combined License
COLA	Combined License Application
DCD	Design Control Document
DOE	U.S. Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ER	Environmental Report
ESP	Early Site Permit
ESRP	Environmental Standard Review Plan
FAA	Federal Aviation Administration
FAST	Fixing America's Surface Transportation Act
FAST-41	Title 41 of FAST
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
GEIS	Generic Environmental Impact Statement
HALEU	High-Assay Low-Enriched Uranium
LCA	Life-Cycle Assessment
LWR	Light-Water Reactor
LLWR	Large Light-Water Reactor
LRA	License Renewal Application
MW	Megawatts
NEI	Nuclear Energy Institute
NEIMA	Nuclear Energy Innovation and Modernization Act
NIA	Nuclear Innovation Alliance
NEPA	National Environmental Policy Act
NOA	Notice of Availability
NOI	Notice of Intent
NRC	U.S. Nuclear Regulatory Commission
RAI	Request for Additional Information
ROD	Record of Decision
SAMA	Severe Accident Mitigation Alternatives
SEIS	Supplemental Environmental Impact Statement
SLR	Subsequent License Renewal
SMR	Small Modular Reactor
TRISO	Tri-Structural Isotropic Particle Fuel
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service

1 INTRODUCTION

The National Environmental Policy Act² (NEPA or “the Act”) is a procedural statute with two principal aims.³ Specifically, NEPA requires a federal agency to take a “hard look” at the impacts of a proposed action on the environment before acting⁴ and to inform the public that it has indeed considered environmental concerns in its decision-making process.⁵ NEPA directs agencies to perform straightforward and concise environmental reviews that are proportionate to the potential impacts of the actions under review, and the effective conveyance of the relevant decisions to the public in a timely manner.⁶

Contrary to this stated mission, NEPA environmental analyses have become increasingly burdensome both in terms of time and resource expenditures since the statute’s adoption in 1970.⁷ In 1997, the Council on Environmental Quality (CEQ) aptly observed that agencies were attempting to generate “litigation proof” NEPA reviews, thereby increasing time and costs often with no corresponding increase in review quality.⁸ Despite CEQ’s recommendation that the entire environmental impact statement (EIS) process should only take 12 months (even for the most complex energy projects), the U.S. Nuclear Regulatory Commission (NRC) often exceeds this timeline.⁹ In fact, the NRC estimates it will take 24-36 months to complete environmental reviews for nuclear fuel cycle facilities or new reactors. The NRC’s lengthy regulatory review process—particularly the NEPA component—can be a real-world barrier both to technological innovation and continued reliance on nuclear energy relative to other generation sources with greater environmental impacts (especially carbon and other greenhouse gas emissions).

Further, the current NEPA process for licensing nuclear facilities is not commensurate with the anticipated environmental impacts of nuclear reactors. In addition to compliance with NRC regulations, applicants also must comply with federal, state, and local permits that specifically govern the impact of licensed facilities in many resource areas. Over the many years of reactor operating experience, the U.S. nuclear fleet has proven to be among the most environmentally benign sources of power generation, and has had an overwhelmingly positive impact in terms of socioeconomic benefits and avoided carbon emissions.

In comparing NRC implementation of NEPA with other federal agencies, the NRC is an outlier in several significant respects. The NRC utilizes an overly burdensome environmental review process to solicit stakeholder input, as required by NEPA, and to develop the draft and final EISs or environmental assessments (EAs) for proposed licensing actions. In addition to the opportunity for public participation in scoping and commenting on the draft EIS, NRC regulations also provide an opportunity for prospective “intervenor” to seek trial-type adjudicatory hearings that can take weeks, months, or even years to complete. These hearings, which are not required by NEPA, can delay the completion and add

2 The National Environmental Policy Act of 1969, as amended (Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended by Pub. L. 94-52, July 3, 1975, Pub. L. 94-83, August 9, 1975, and Pub. L. 97-258, § 4(b), Sept. 13, 1982).

3 *Baltimore Gas and Electric Co. v. Natural Resources Defense Council, Inc.* 462 U.S. 87, 97 (1983) (citing *Vt. Yankee Nuclear Power Corp. v. Nat. Res. Def. Council, Inc.*, 435 U.S. 519, 553 (1978)).

4 *Id.*

5 *Id.*

6 Final Guidance on Improving the Process for Preparing Efficient and Timely Environmental Reviews under the National Environmental Policy Act, 77 FR 14475 (Mar. 12, 2012).

7 According to 2013 Department of Energy data, the median EIS cost \$1.7 million to conduct.

8 CEQ, ENVIRONMENTAL QUALITY -- 25TH ANNIVERSARY REPORT OF THE COUNCIL OF ENVIRONMENTAL QUALITY (1995)

<https://ceq.doe.gov/docs/ceq-publications/nepa25fn.pdf>; Bradley C. Karkkainen, *Toward a Smarter NEPA: Monitoring and Managing Government’s Environmental Performance*, 102 Colum. L. Rev. 903, 917-18 (2002).

9 46 FR 18026 (March 23, 1981), CEQ Forty Questions, Question 35, <https://www.energy.gov/nepa/downloads/forty-most-asked-questions-concerning-ceqs-national-environmental-policy-act>.

to the cost of the NRC licensing process. As part of the agency's effort to streamline NEPA compliance, the NRC should eliminate this duplicative hearing opportunity, as it applies to environmental issues, given the various other vehicles for public participation on environmental issues already provided by NEPA and NRC regulations. NEI is preparing a paper that will amplify upon this proposal to eliminate duplicative environmental hearings and will submit it to the NRC under separate cover.

Notably, in the critically important area of subsequent license renewal (SLR) for the current fleet of U.S. power reactors, the NRC has made marked progress in streamlining the NEPA review process. The NRC established an optimized, 18-month review schedule for SLR applications, which was originally piloted with the River Bend Nuclear Generating Station initial license renewal application (LRA). Three plants have submitted SLR applications, with the first one (for Turkey Point Units 3 and 4) received by the NRC on January 30, 2018. The final safety evaluation report (SER) and final supplemental environmental impact statement (SEIS) were completed 18 and 21 months after LRA submittal, respectively. The draft SEIS for Peach Bottom and for Surry have both been issued within 12 months of SLR application submittal. If this trend continues, NRC should be able to meet their proposed review schedule of 18 months for the entire application by applying lessons learned from these initial SLR applications. The NRC's approach to improve and streamline SLR applications should be applied to advanced reactor environmental reviews, and the NRC has indicated a willingness to examine the existing process. It warrants mention, however, that NRC's relicensing reviews make use of a generic environmental impact statement (GEIS) that addresses many environmental issues generically, thereby reducing the scope of necessary site-specific impact analyses.

In April 2013, the NRC released the "New Reactor Licensing Process Lessons Learned Review" report.¹⁰ The report identified several challenges associated with environmental reviews, including timely development and maintenance of regulatory guidance, improvements to the NRC's management system for requests for additional information (RAIs), and maintaining communications in an open, transparent, and timely manner.¹¹ In 2018, the NRC formed the Environmental Review Working Group to examine agency plans for advanced reactor environmental reviews to ensure efficiency and appropriate focus. In April 2019, the NRC began seeking contractor support to provide technical assistance in evaluating the NRC's environmental review process and providing recommendations to reduce the size and length of environmental reviews, EISs, and other NEPA-related documents while maintaining a high-level of technical adequacy.

Despite NRC's efforts to improve the environmental review process, the NRC's NEPA implementation remains too lengthy, complex, and costly. NEI and several non-governmental organizations (NGOs) have been active in supporting changes to expedite environmental reviews for advanced reactors,¹² which includes light-water and non-light water small modular reactors (SMRs) and micro-reactors. The findings of this report highlight areas where there is a need to make changes to NRC practices, procedures, guidance, and regulations, as appropriate, to streamline future environmental reviews. This report considered the effort associated with NRC environmental reviews for combined license (COL) applications, early site permit (ESP) applications, and LRAs over the past 10 years. This report also evaluates whether the NRC has, in practice, made its reviews of environmental impacts more efficient. As much of the work done thus far has focused on examining the current process, it is now time to implement the lessons learned and streamline the NRC's environmental reviews.

¹⁰ NRC 2013. New Reactor Licensing Process Lessons Learned Review: 10 CFR Part 52. ML13059A239.

¹¹ Id.

¹² The term "advanced reactor" is used broadly to encompass passively safe, small modular, and non-light water reactors.

Based on information collected on various environmental issues, data and specific examples obtained from publicly available information, and legal analysis, this paper provides several recommendations that the NRC can implement in the near term. The report also identifies specific NRC environmental review processes or components that should be improved, including, for example, audit preparation, environmental report (ER) content requirements, and RAI issuance. The specific recommendations apply to the expanded definition of “advanced reactor” to include both “non-light water reactors and small modular light-water reactors [LWR] (including micro-reactors of 50 [megawatts] MW or less), with passive or inherent safety features that require comparatively fewer controls or operational intervention to avoid accidents in the event of malfunction, and rely on natural forces such as gravity, natural convection, or resistance to high temperatures.”¹³

With this report, NEI provides a comprehensive assessment of recommendations from advanced reactor developers, utilities with interest in advanced reactor deployment, and the complimentary papers published by ClearPath and the Nuclear Innovation Alliance (NIA). As the nuclear industry prepares for advanced reactor licensing, construction, and operation, the NRC must also streamline the environmental review process for advanced non-LWRs and SMRs.

2 BACKGROUND

The concept of streamlining NEPA reviews is certainly not new, as illustrated by an article from 1981 written by Nick Yost, who was the lead author of the original CEQ NEPA implementing regulations issued in 1979 (and still in use today). Mr. Yost addressed the impact of NEPA-related litigation, which resulted in very lengthy EISs which ceased to be usable (or useful) by decisionmakers or members of the public, the intended audience.¹⁴ Business investors also became concerned about the inordinate time necessary to satisfy the NEPA process.¹⁵ Mr. Yost’s concerns remain valid today—nearly 40 years later.

Thus, it comes as no surprise that in December 2015, President Obama signed Title 41 of the Fixing America’s Surface Transportation Act (FAST-41),¹⁶ which established voluntary practices to standardize and expedite NEPA compliance for surface transportation and other major construction projects. FAST-41 encompasses energy production infrastructure projects,¹⁷ including the construction of new nuclear power plants.

Executive Order (EO) 13807, Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects,¹⁸ signed by President Trump in August 2017, reinforces FAST-41 by requiring streamlining provisions for federal agencies reviewing major infrastructure proposals, including nuclear power plant development proposals. Together, FAST-41 and EO 13807 require agencies to complete the NEPA process from notice of intent (NOI) to record of decision (ROD) within an average of 24 months, develop a transparent tracking system for monitoring the progress of environmental reviews, and establish a lead federal agency for each proposal to coordinate reviews by multiple agencies leading to a single federal decision.

13 ClearPath. 2019. White Paper: Advocating the Use of Generic Environmental Impact Statements in Support of the Construction and Operation of Advanced Nuclear Reactors. February 29, 2019.

14 Nicholas C. Yost, Streamlining NEPA – An Environmental Success Story, 9 B.C. Env’tl. Aff. L. Rev. 507 (1981), <http://lawdigitalcommons.bc.edu/ealr/vol9/iss3/2>.

15 Id.

16 42 U.S.C. Part 4370m.

17 42 U.S.C. Part 4370m(6)(A).

18 EO 13807 (August 15, 2017) 82 Fed. Reg. 40463 (August 24, 2017).

NRC FAST-41 projects to date are all in the conventional energy production sector as defined in FAST-41. These projects include Levy Nuclear Plant Units 1 and 2, Turkey Point Units 6 and 7, and William States Lee III Nuclear Station Units 1 and 2. The target timeline for the completion of the NEPA process from NOI to ROD is an average of 24 months. However, the actual time to complete each of these NRC-licensed projects far exceeded that estimate: Levy – 8 years, Turkey Point – 7.8 years, and Lee – 8.8 years.¹⁹ The NRC currently has no FAST-41 projects in progress, but these fairly recent review periods underscore the substantial need for much more timely and efficient NRC environmental reviews.

On June 20, 2018, CEQ published an advance notice of proposed rulemaking (ANPRM) in the Federal Register titled “Update to the Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act.”²⁰ The ANPRM requested “comments on potential revisions to update and clarify CEQ NEPA regulations”²¹ as it considers substantively revising the regulations with a subsequent rulemaking. CEQ’s request for comment on potential revisions to NEPA regulations included 20 questions divided into three categories: NEPA process, scope of NEPA review, and general. CEQ repeatedly cited the need to “ensure a more efficient, timely, and effective NEPA process consistent with the national environmental policy stated in NEPA.”²² Subsequently, on January 10, 2020, CEQ published for comment the proposed rule.²³ Many of the proposed changes in the CEQ’s rulemaking should be considered as the NRC reviews its own environmental review process. Adopting these changes would improve efficiency and effective environmental analysis and are in line with this paper’s recommendations.

On January 14, 2019, President Trump signed the Nuclear Energy Innovation and Modernization Act²⁴ (NEIMA), which passed with bipartisan support in both the Senate and the House. Among other things, this legislation directs the NRC to modify the licensing process for commercial advanced nuclear reactor facilities to enhance predictability and efficiency, while ensuring adequate protection of public health and safety.

Additional directives issued since 2010 have included: various CEQ memoranda for heads of federal departments and agencies since the American Recovery and Reinvestment Act of 2009 (“Stimulus” Act), including Improving the Process for Preparing Efficient and Timely Environmental Reviews under the National Environmental Policy Act (March 6, 2012); EO 13766 – Expediting Environmental Reviews and Approvals for High Priority Infrastructure Projects (January 24, 2017); Department of Interior Order No. 3355 – Streamlining NEPA Reviews and Implementation of EO 13807 (August 31, 2017); and the White House’s Legislative Outline for Rebuilding Infrastructure in America (January 31, 2018), to name just a few.

The foregoing government-wide initiatives make clear that there is a broad movement toward more efficient and less onerous NEPA reviews.

19 Although these review durations may have been impacted by project delays, it is noted that the NRC review process was a significant contributor to prolonged reviews and was not conducive to meeting the 24-month target.

20 83 Fed. Reg. 28591 (June 20, 2018).

21 Id.

22 A number of stakeholders, including NEI, have filed comments in response to the 20 questions posed by CEQ.

23 “Update to the Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act,” 85 Fed. Reg. 1684, Friday January 10, 2020.

24 Public Law 115–439—JAN. 14, 2019 132 STAT. 5565.

3 COSTS AND TIMELINE STATISTICS

Empirical data indicate that there has been a major increase in the level of detail and volume of information considered by the NRC in its license application reviews with no clear justification. As previously documented by NEI in 2018 in its recommendations for enhancing the safety focus of new reactor regulatory reviews, corresponding costs also have substantially increased, as illustrated in Figure 1.²⁵

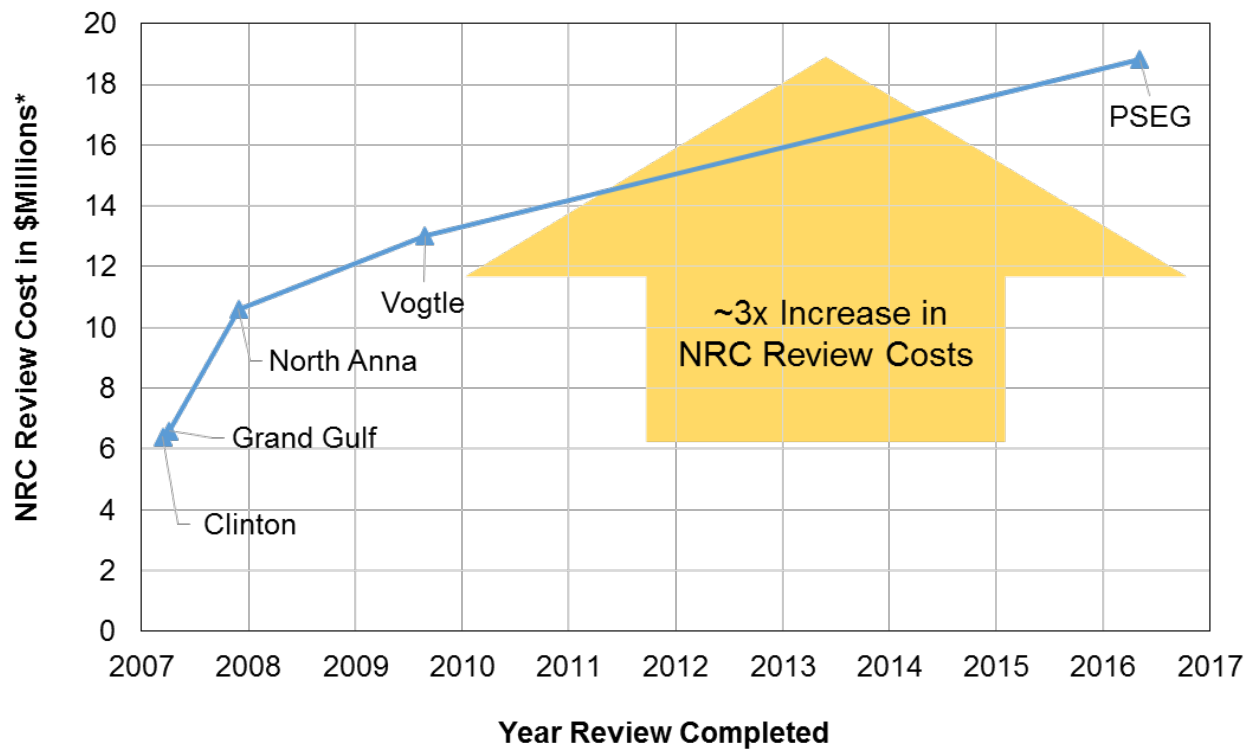


Figure 1: NRC Review Costs for ESPs (*reported in 2017 dollars)

In addition to increased costs, the time required for reviews has increased dramatically. A December 14, 2018, report from the CEQ identified that of the 1,161 EISs for which a notice of availability (NOA) of a final EIS (FEIS) was published between 2010 and 2017, the average completion time (NOI to ROD) was 4.5 years; half of these took longer than 3.5 years. The NRC averaged 3.7 years, with a range of 1.1 years (decommissioning an in-situ recovery project in Wyoming) to 8 years or more for multiple combined license applications (COLAs). In addition, the NRC had five FEISs for which there was no ROD, ranging from 2.4 to 8.1 years.²⁶ Note that the data processed did not include FEISs published during the 2010-2017 period for which a ROD was still in preparation, on hold, or not planned as of June 7, 2018.

²⁵ Recommendations for Enhancing the Safety Focus of New Reactor Regulatory Reviews. Nuclear Energy Institute (2018).

²⁶ CEQ Environmental Impact Statement Timelines (2010-2017); December 14, 2018; retrieved from <https://ceq.doe.gov/docs/nepa-practice/CEQ_EIS_Timelines.xlsx>.

The Nuclear Innovation Alliance (NIA) also addressed the issue of vastly-expanded NRC reviews in discussing the size of recent NEPA documents.²⁷ For example, NEPA documentation for the construction and operation of the Palo Verde Nuclear Power Plant was approximately 700 pages in length, including appendices and responses to comments.²⁸ Prepared in the early 1980s, the NEPA analysis evaluated environmental impacts for a three-unit power plant on a greenfield site. Palo Verde is located near Tonopah, Arizona, and is the largest nuclear generating station in the United States.

In comparison, NEPA documentation for Plant Vogtle Units 3 and 4, recently licensed and currently under construction as a two-unit expansion on an existing nuclear plant site, totaled over 1,500 pages.²⁹ Yet, Appendix A to 10 CFR Part 51 states that an EIS should normally be about 150 pages in length, and up to 300 pages for an unusually complex project.³⁰ Recognizing that there are unique features to every project, the doubling of pages from Palo Verde in the 1980s to the Vogtle 3 and 4 units is an alarming increase. Figure 2 further illustrates this concerning trend in the length of NRC NEPA review documentation.

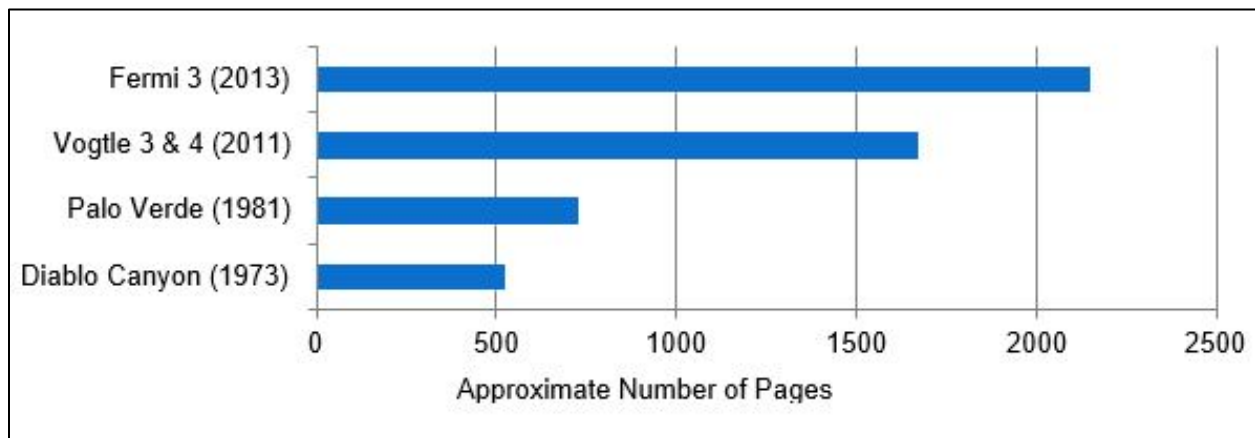


Figure 2: Approximate Length of NRC NEPA Review Documentation (developed by NIA from NRC documents)

4 RECOMMENDATIONS

The NRC has recognized that advanced reactors have characteristics, such as size, resource usage, and design simplicity, which affect the scope and detail of the environmental review. As such, the NRC has conveyed its intent to appropriately scale its reviews.³¹ Additionally, we note that new large light-water reactors (LLWRs) would share attributes such as passive safety features, and also benefit from hundreds of reactor years of operating experience that reflects generally small environmental impacts. The

²⁷ Nuclear Innovation Alliance, Streamlining NRC NEPA Reviews for Advanced Reactor Demonstration Projects While Safeguarding Environmental Protection” (September 2019) <https://www.nuclearinnovationalliance.org/streamlining-nrc-nepa-reviews-advanced-reactor-demonstration-projects>.

²⁸ NRC, Draft Environmental Statement Related to the Operation of Palo Verde Nuclear Generating Station, Units 1, 2, and 3. (providing the final EIS for the for construction permit for Palo Verde, and the draft EIS for Palo Verde’s operating permit).

²⁹ NRC, NUREG 1872, Final Environmental Impact Statement for an Early Site Permit (ESP) at the Vogtle ESP Electric Generating Plant Site (Aug. 2008), <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1872/>; NRC, NUREG- 1947, Final Environmental Impact Statement for Combined License (COLS) for the Vogtle Electric Generating Plant Unit 3 and 4 (Mar. 2011), <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1947/>.

³⁰ 10 CFR Part 51, Appendix A to Subpart A 1(b).

³¹ NRC Presentation, “Preparation for Advanced Reactors Environmental Reviews, Including Integration of NEPA Processes” (March 2019) <https://www.nrc.gov/public-involve/conference-symposia/ric/past/2019/docs/abstracts/cushingj-w23-hv.pdf>.

recommendations listed below and discussed in subsequent sections are based on both legal analysis and industry feedback.

1. Revise 10 CFR 51.20 to eliminate the list of NRC’s licensing actions that require an EIS, and allow for the flexibility to use EAs and categorical exclusions for those licensing actions.
2. Increase the use of GEISs to address issues and impacts that are expected to be common to most, if not all, advanced reactor designs.
3. Strengthen the regulations and guidance to require NRC staff to review and incorporate existing environmental analyses into a project’s EA or EIS.
4. Incorporate into NRC regulations the flexibility to use the applicant’s environmental report as the basis for the draft EA or EIS.
5. Reduce burdensome alternative site analyses by limiting the scope of these analyses to those that are realistic and within the NRC’s jurisdiction.
6. Increase the efficiency of environmental reviews through targeted process improvements.

4.1 Revise 10 CFR 51.20 to eliminate the list of NRC’s licensing actions that require an EIS and allow for the flexibility to use EAs and categorical exclusions for those licensing actions.

There are three levels of analysis under NEPA: categorical exclusions, EAs, and EISs. The focus of this section will be on the benefits and applicability of using an EA instead of an EIS and why it is appropriate to reexamine how the NRC uses categorical exclusions.

4.1.1 Standard for an EIS

When a major federal action³² is proposed, the NRC must determine the level of NEPA review required for the specific action. CEQ has defined “major” federal action to “include actions with effects that may be major and which are potentially subject to federal control and responsibility.”³³ CEQ’s definition further provides that “major” “reinforces but does not have a meaning independent of significantly.”³⁴ Analysis of a significant action turns on the consideration of both the context and intensity factors, of which there are nine.³⁵ The cumulative review of these factors leads to a decision on the appropriate class of action: categorical exclusion, EA, or EIS. The Fifth Circuit noted in *Spiller v. White* that agencies should analyze the factors of intensity and context in determining the class of action, but that they are “simply a list of relevant factors that should be considered in gauging whether an impact is ‘intense’ and,

³² NEPA defines “major federal action” to include a broad set of categories ranging from adoption of official policy, such as rules, regulations and interpretations adopted pursuant to the Administrative Procedure Act (5 USC 551)(§1508.18(b)(1)) to “[a]pproval of specific projects such as construction or management activities located in a defined geographic area. Projects include actions approved by permit or other regulatory decisions as well as federal and federally assisted activities.” §1508.18(b)(4).

³³ 40 CFR § 1508.18.

³⁴ *Id.*

³⁵ 40 CFR § 1508.27 (a) and (b).

therefore, significant.”³⁶ The court added that one need not perform a fact-by-fact analysis; rather, one needs only to demonstrate the factors were addressed and evaluated in some way.³⁷

The NRC takes a different approach in determining significance. First, many of the licensing activities for new reactors have been identified as *per se* significant and scripted into the regulations to require an EIS by default.³⁸ While it may seem efficient to pre-designate which activities require an EIS, it also forecloses the NRC’s ability to consider the specifics of the application under review and make a threshold determination as to whether the action is truly significant and warrants an EIS-level of review. Further, when the NRC does perform a review of the context and intensity factors, it requires only one factor to be met to trigger an EIS. Consequently, the NRC’s current practice generates far more EISs than are necessary, and substantially reduces, if not eliminates, the option of using an EA for certain types of actions. The NRC also reserves the ability to require an EIS for “any other action which the Commission determines is a major ... action significantly affecting the ... human environment.”³⁹ The NRC’s broad utilization of EISs reflects an apparent desire to use a level of analysis that will insulate the NRC from legal challenges. This approach, unfortunately, limits both industry’s and agency’s ability to use cost-efficient, yet still robust, EAs for nuclear reactor licensing actions.

Over many hundreds of reactor operating years, the U.S. nuclear fleet has proven to be among the most environmentally benign sources of power generation. Categorically requiring an EIS for new reactor licensing projects arbitrarily ignores the characteristics of advanced reactors and the history of current reactors and undermines the agency flexibility and discretion that flows from NEPA’s rule of reason. The NRC, in other words, should strongly consider presuming that advanced reactor environmental impacts can be appropriately analyzed via an environmental assessment unless the agency makes a project-specific finding of significant impact(s) that triggers the actual need for an EIS.

4.1.2 EAs Satisfy NEPA Requirements for Advanced Nuclear Projects

An EA is intended to be a flexible tool to fit the agency’s decision-making needs and the needs of the specific project. CEQ’s regulations define an EA as a concise public document for the Federal agency to use to meet its NEPA obligations.⁴⁰ If the analysis does not indicate the action’s effects would be significant, then the agency issues a finding of no significant impact (FONSI).⁴¹ In practice, this requires agencies to identify a project’s potential environmental impacts with some degree of involvement from the applicant, agencies and the public.⁴² The EA analysis serves as the basis for the FONSI,⁴³ which is a separate legal finding, published for public comment that “briefly present[s] the reasons why an action, not otherwise excluded, will not have a significant effect on the human environment and for which an environmental impact statement therefore will not be prepared.”⁴⁴ If significant environmental impacts

³⁶ 352 F.3d 235, 243 (5th Cir. 2003).

³⁷ *Id.*

³⁸ See 10 CFR § 51.20, “Classification of Licensing and Regulatory Action: Criteria for an identification of licensing and regulatory actions requiring environmental impact statements.” (The NRC expressly requires EISs for eleven categories of actions. Five involve licenses to build, operate, or redesign nuclear power reactors, three involve licenses to possess and enrich nuclear material, two involve licenses to store and dispose of waste, and one involves termination of licenses).

³⁹ 10 CFR § 51.20(b)(14).

⁴⁰ 40 CFR §1508.9.

⁴¹ *TOMAC, Taxpayers of Michigan Against Casinos v. Norton*, 433 F.3d 852, 861 (D.C. Cir. 2006).

⁴² 40 CFR 1501.4(b); See also 1508.9(b); See generally, *Committee to Preserve Boomer Lake Park v. Department of Transp.*, 4 F.3d 1543, 1555 (10th Cir. 1993).

⁴³ See *Cure Land, LLC v. U.S. Dep’t of Agric.*, 833 F.3d 1223 (10th Cir. 2016).

⁴⁴ 40 CFR § 1508.13.

may exist, then the agency can exercise its authority to move to prepare a full-fledged EIS.⁴⁵ Courts grant substantial deference to agencies' decisions on the need for EAs versus EISs.⁴⁶

The NRC has experience in utilizing EAs for complex actions specifically in the area of nuclear materials. NUREG-1748, Environmental Review Guidance for Licensing Actions Associated with NMSS Programs, provides extensive guidance on when an EA should be used and the path for a simple or complex action.⁴⁷ The guidance illustrates use of an EA to meet NEPA requirements for complex actions, reducing the number of unnecessary and inefficient EISs, and relieving the NRC and the applicant from unnecessarily wasting resources.⁴⁸ This format can be easily applied to licensing new reactor technologies.

The NRC should implement CEQ guidance, which encourages agencies to consider how to mitigate environmental impacts in the project design to reduce the impact of a proposed action, such that it is not "significant," through the development of an EA that supports a "mitigated FONSI."⁴⁹ Agencies may commit to mitigation measures considered as alternatives in an EA to achieve an environmentally preferable outcome, or they may commit to support a mitigated FONSI, so as to complete the review of potentially significant environmental impacts without preparing an EIS.⁵⁰

For the NRC to leverage EAs in the environmental reviews of advanced reactors, the NRC will have to change the current regulations, which, as noted above, identify specific types of actions as requiring an EIS. NEI recommends that the NRC modify 10 CFR 51.20 to strike the list of NRC licensing actions that require an EIS, and instead permit the NRC to determine the level of review that is appropriate for, and commensurate with, the effects of the specific action under consideration. This approach would be highly advantageous because advanced reactors are reasonably expected to have relatively small environmental impacts, just as the current fleet of US nuclear reactors were concluded to have generally small environmental impacts based on many years of operation and associated environmental data. The level of environmental review required should coincide with the magnitude of likely environmental impacts. Examples of advanced reactor characteristics that result in small environmental impacts and warranting the use of EAs (as opposed to an EISs) include:

- Low potential radiological consequences by incorporating features such as:
 - Potential for siting subgrade for more protection from natural or human-induced hazards
 - Passive safety systems allowing for improved accident avoidance and tolerance
 - Smaller source terms

⁴⁵ 40 CFR § 1501.4(c)

⁴⁶ See 462 U.S. 87, 97; e.g., *Sierra Club v. Hodel*, 848 F.2d 1068, 1089 (10th Cir. 1988).

⁴⁷ *Id.* at p. 3-7.

⁴⁸ U.S. Nuclear Regulatory Commission, NUREG-1748, *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs*, Final Report (Aug. 2003).

⁴⁹ CEQ 2011. Memorandum for Heads of Federal Department and Agencies. *Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact*.

⁵⁰ *Id.*

- Potential for low resource utilization (per MWh/yr compared to other generation sources)⁵¹ by incorporating features such as:
 - Minimal use of, and impact to, local water sources
 - Few materials and resources required to construct and operate
 - Small land use

4.1.3 Consideration for the Use of Categorical Exclusions

NRC's process is to consider categorical exclusions if the Commission has identified one by rule or regulation, after first finding that the category of actions does not individually or cumulatively have a significant effect on the human environment. The regulations also allow for the Commission, in special circumstances, to not require an environmental assessment or an environmental impact statement.

CEQ's proposed rule indicates that the mere presence of extraordinary circumstances does not preclude the application of a categorical exclusion. Further, CEQ recommends that an "agency may consider whether there is a close causal relationship between a proposed action and the potential effect on the conditions identified as extraordinary circumstances, and if such a relationship exists, the potential effect of the proposed action on the conditions."⁵² An agency is entitled at that point to modify the proposed action to avoid the extraordinary circumstances so that the action may fit into a categorical exclusion. The current NRC regulations do not provide for this latitude.

This recommendation is focused on the NRC considering how it can provide more latitude to consider categorical exclusions based on the circumstances of the proposed action. Specifically, in the case of advanced reactor designs that may repeatedly lead to a finding of no significant impact, the agency should add a category for licensing actions that may be modified to avoid the extraordinary circumstance. Further, as licensing experience continues, initial reviews of advanced nuclear applications may create an avenue for precedent-setting analysis that can be incorporated into 10 CFR 51.22.

Precedent has been set within other federal agencies for use of categorical exclusion. The U.S. Department of Energy's (DOE) implementing regulations for NEPA⁵³ in Appendix B to Subpart D of Part 1021 includes the following categorical exclusions that are classes of actions that DOE has determined do not individually or cumulatively have a significant effect on the human environment:⁵⁴

- B5.15 – Small-scale renewable energy research and development and pilot projects
- B5.16 – Solar photovoltaic systems
- B5.17 – Solar thermal systems

⁵¹ For example, NuScale Environmental Footprint. <https://www.nuscalepower.com/environment/environmental-footprint>. Accessed October 8, 2019.

⁵² 85 Fed. Reg. 1696, January 10, 2019.

⁵³ 10 CFR 1021.

⁵⁴ 10 CFR §1021.410.

- B5.18 – Wind turbines (small scale)
- B5.19 – Ground source heat pumps
- B5.20 – Biomass power plants
- B5.24 – Drop-in hydroelectric systems
- B5.25 – Small-scale renewable energy research and development and pilot projects in aquatic environments

The Department of Energy regulations provide details about the above listed projects, among others, that would be considered categorically excluded. Many of these projects are in the same scale and size of some advanced reactors. The development of similar categorical exclusions should be considered by the NRC. The use of categorical exclusions, even by categories of review, should not be ignored in the process to streamline and improve efficient NEPA reviews.

4.2 Increase the use of Generic Environmental Impact Statements (GEISs) to address issues and impacts that are expected to be common to most, if not all, advanced reactor designs.

In the near future, the NRC may receive and need to review more nuclear reactor designs than at any other time in its history. With that in mind, the NRC is in the position to take advantage of the time it has now and create a GEIS to address common environmental issues. Currently, the NRC utilizes GEISs for license renewal, decommissioning, in-situ leach uranium mining facilities, continued storage of spent nuclear fuel, and license termination of NRC-licensed nuclear facilities. The NRC should look to its existing GEIS documents and leverage what it can in the context of advanced reactors.

Recently, the NRC has recognized the importance of exploring a GEIS for advanced reactors. The exploratory process is intended to determine whether to prepare a GEIS for the construction and operation of advanced nuclear reactors.⁵⁵ In the Federal Register notice, the NRC states that an advanced nuclear reactor GEIS (ANR GEIS) may “improve the efficiency of the environmental review process.”⁵⁶ Further, the NRC states, the “ANR GEIS would streamline the environmental review process for advanced nuclear reactor environmental reviews.”⁵⁷ NEI submitted comments on the ANR GEIS separately from this paper. That submittal includes specific responses to the questions presented by the NRC in the federal register notice.

It is notable to point out that CEQ encourages the use of a GEIS in its regulations. Specifically, CEQ states “agencies may find it useful to evaluate the proposal(s)...generically, including actions which have relevant similarities, such as common timing, impacts, alternatives, methods of implementation, media, or subject matter.”⁵⁸ Based on the hundreds of operating years of existing plants and an understanding of advanced reactors, a GEIS is appropriate and necessary to reduce the administrative burden that follows when a new EIS is created for each application.

⁵⁵ Agency Action Regarding the Exploratory Process for the Development of Advanced Nuclear Reactor Generic Environmental Impact Statement, 84 Fed. Reg. 62559 (November 15, 2019).

⁵⁶ *Id.*

⁵⁷ *Id.*

⁵⁸ 40 CFR §1502.4.

4.2.1 Utilizing a Generic Environmental Impact Statement

As noted by the NRC, a GEIS is intended to afford the agency a level of efficiency in reviewing environmental factors that are consistent across an environmental review. The NRC's GEIS for license renewal is a good place to start in developing a GEIS for advanced reactors.⁵⁹ NUREG-1437 assesses 92 environmental issues, sixty-eight of which are deemed category 1 and are identified in 10 CFR Part 51 as not requiring additional plant-specific analysis.⁶⁰ NUREG-1437 states that the Commission was motivated to create a GEIS for license renewal because it believed the environmental impacts could be reasonably predicted, were well understood from operating experience to date and changes in the environment around existing nuclear plants are gradual.⁶¹ Likewise, those conclusions could be applied as the justification for creating a GEIS for advanced reactors.

Further, consideration should be given to the existing state and federal permits that are required of nuclear plants and given credit in the NRC's review. NEI concurs with ClearPath's report that, "potential environmental impacts can be mitigated or controlled through compliance with permits issued by agencies besides NRC" and thus be dealt with generically.⁶² Areas such as groundwater and surface water impacts may be dealt with through existing permit programs, air quality impacts may be dealt with by EPA and state environmental agencies and impacts to wetlands may be addressed through a Clean Water Act Section 404 Permit, for example.⁶³ The NRC should also look at Appendix A of ClearPath's report which offers a preliminary assessment of categories to be considered in either the GEIS or supplementary environmental impact statement (SEIS). Appendix A of ClearPath's report lists 20 major categories to consider under a GEIS or SEIS. It is anticipated that the SEIS would support a GEIS by providing site-specific information where appropriate. The SEIS should allay any fears that a GEIS would be insufficient in capturing a site's environmental impact. The SEIS will support any unique impacts that require analysis.

NEI recommends that NRC leverage the experience of the current reactor fleet and their existing GEISs to drive towards smart environmental reviews that are effective and efficient.

4.3 Strengthen the regulations and guidance to require NRC staff to review and incorporate existing environmental analyses into a project's EA or EIS.

While NEPA compliance can often prove cumbersome for both the applicant and federal agencies, CEQ regulations encourage broad reliance on environmental analysis already conducted by entities working on similar projects.⁶⁴ In this vein, the NRC should streamline its NEPA processes by expanding its reliance on existing analyses and tiering. This should take the form of serving as a cooperating agency on joint projects, adopting another agency's EISs, incorporating by reference materials previously created by NRC or other experts, and expanding the use of tiering. While the NRC authorizes each of these techniques to some extent in guidance, its regulations in Part 51 should be modified to clearly require reliance on documents produced by other agencies, whenever applicable.

⁵⁹ NUREG-1437, Volume 1, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Main Report."

⁶⁰ NUREG-1437, Vol. 1. Sec. 1.6, "Scope of the GEIS."

⁶¹ NUREG-1437, Vol 1. Sec. 1.1.

⁶² Clearpath, "Advocating the Use of Generic Environmental Impact Statements in Support of the Construction and Operation of Advanced Nuclear Reactors," at p. 7 (submitted to the NRC on February 19, 2019), <https://www.nrc.gov/docs/ML1905/ML19059A426.pdf>.

⁶³ Id.

⁶⁴ See 40 CFR § 1502.20-21.

4.3.1 Adoption of Other Agencies' Environmental Analyses

Even when a federal agency is acting alone on a project, it may adopt in whole, or in part, a draft or final EIS previously prepared by a different agency provided that the statement meets the standards for an adequate statement under CEQ regulations.⁶⁵ CEQ guidance further encourages agencies to adopt portions of other agencies' environmental analyses when preparing their own environmental reviews.⁶⁶ The notice and comment requirements vary depending on how closely the original EIS tracks with the proposed action under review. If the actions covered by the original EIS and the proposed action are substantially the same, the agency adopting the EIS is not required to recirculate the document as a draft for public review and comment.⁶⁷ Otherwise, the adopting agency must treat the original EIS as a draft and recirculate it.⁶⁸

Courts give substantial deference to agencies that follow CEQ's regulations and uphold most agency decisions to adopt existing EISs from other agencies. In *Holy Cross Wilderness Fund v. Madigan*, the U.S. Army Corps of Engineers adopted an EIS conducted by the U.S. Forest Service (USFS) when issuing a permit to dredge and fill creeks in a wetlands area.⁶⁹ Before finding the USFS's EIS sufficient on its merits for this project, the Tenth Circuit reiterated CEQ regulations stating that agencies may adopt a draft or final EIS from another agency.⁷⁰ Importantly, the court cited the U.S. Army Corps of Engineers' own deferential regulations allowing the agency to adopt EISs unless it finds "substantial doubt as to technical or procedural adequacy or omission of factors important to the Corps decision."⁷¹ The Fourth Circuit also upheld a Federal Aviation Administration (FAA) decision to adopt an EA prepared by the Navy, even though the FAA's own regulations were silent on adoption authority.⁷² The Court concluded "the FAA's acquiescence in the CEQ regulations, its independent review and adoption of the Navy's supplemental environmental assessment, and the issuance of its own FONSI, were sufficient to comply with NEPA."⁷³

It is the stated policy of the NRC to allow adoption of other agencies' environmental analyses as described in the CEQ regulations.⁷⁴ In Appendix A to Subpart A of Part 51, NRC's regulations reiterate CEQ's adoption guidelines in 40 CFR 1506.3.⁷⁵ However, the NRC does not specifically codify agency practices for adopting EISs. The lone exception is that under the *Nuclear Waste Policy Act*, the NRC is required to the extent practicable to adopt the DOE's EIS for a proposed high-level radioactive waste geologic repository.⁷⁶ No further NEPA consideration is required if the NRC determines DOE's analysis is relevant, and the NRC can adopt the EIS after first recirculating the document as a final EIS.⁷⁷ More generally, in instances where the action is covered by another agency's EIS and the NRC proposal is not substantially the same, the NRC can adopt the EIS in part by treating the other agency's final document as part of an NRC draft EIS.⁷⁸ An example of adoption not explicitly codified in Part 51 is NRC's use of the

⁶⁵ 40 CFR § 1506.3(a).

⁶⁶ *Final Guidance on Improving the Process for Preparing Efficient and Timely Environmental Reviews under the National Environmental Policy Act*, 77 FR 14478 (Mar. 12, 2012).

⁶⁷ 40 CFR § 1506.3(b).

⁶⁸ *Id.*

⁶⁹ 960 F.2d 1515 (10th Cir. 1992).

⁷⁰ *Id.* at 1522.

⁷¹ *Id.*

⁷² *State of North Carolina v. Federal Aviation Administration*, 957 F.2d 1125, 1130 (4th Cir. 1992).

⁷³ *Id.*

⁷⁴ *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs*, U.S. Nuclear Regulatory Commission 1-8 (Aug. 2003).

⁷⁵ See 10 CFR Part 51, appendix A to subpart A.

⁷⁶ See 10 CFR § 51.109(a)(1).

⁷⁷ 10 CFR § 51.109(d).

⁷⁸ *Environmental Review Guidance*, *supra* footnote 19, at 1-9.

DOE's GEIS for the management of spent nuclear fuel.⁷⁹ As part of the environmental review for a subsequent license request to store Three Mile Island's spent fuel, NRC adopted DOE's EIS, with minor additions, and recirculated it as a draft EIS.⁸⁰

The NRC should streamline its NEPA reviews by codifying into Part 51 the practice of adopting other agencies' EISs. For example, the U.S. Army Corps of Engineers regulations dictate that a district commander "will normally adopt another Federal agency's EIS and consider it to be adequate" unless there is substantial doubt as to the EIS's technical or procedural adequacy.⁸¹ Similarly, DOE regulations require the agency to review any relevant planning and decision making documents "whether prepared by DOE or another agency" to determine if a current proposal has been considered in a prior NEPA document.⁸² If so, DOE must consider adopting the existing document in accordance with CEQ regulations.⁸³ By emulating the U.S. Army Corps of Engineers or DOE and creating a provision in Part 51 authorizing agency EIS adoptions, the NRC would encourage further use of this efficient tool.

4.3.2 Tiering and Incorporation by Reference

CEQ regulations define tiering as covering general matters in a broad EIS with narrower statements or incorporating by reference existing environmental analysis. The definition further specifies that tiering should be applied when actions are at an "early stage (such as need and site selection) to a supplement (which is preferred) or a subsequent statement or analysis at a later stage (such as environmental mitigation)." Tiering is appropriate when it helps the lead agency focus on issues which are ripe for decision and exclude from consideration issues already decided or not.⁸⁴

Additionally, federal agencies may also incorporate material into an EIS or EA by reference when the effect will be to cut down on bulk without impeding agency and public review of the action.⁸⁵ Materials or analyses incorporated by reference are not limited to NEPA documents.⁸⁶ Federal agencies can also cite special technical or professional studies prepared within the agency, by other federal, state, or local agencies, tribal governments, or private entities.⁸⁷ The incorporated material must be clearly cited in the environmental statement and its content briefly described.⁸⁸ That description should identify the referenced materials and the entity that prepared the materials, inform the reader of the purpose and value of those materials, and synopsise the basis provided in those materials that support any conclusions being incorporated.⁸⁹ Material incorporated by reference must also be made reasonably available for inspection and comment by potentially interested persons.⁹⁰

Courts tend to follow the CEQ regulations and permit incorporation of many types of analysis by reference. In *Citizens for Smart Growth v. Secretary of Dept. of Transp.*, 669 F.3d 1203 (11th Cir. 2012), the Federal Highway Administration (FHWA) prepared an EIS for construction of a new bridge as part of a broader traffic management program. The statement incorporated by reference the findings of a relevant feasibility study and corridor report prepared 8 years earlier by the Florida Department of

⁷⁹ *Id.*

⁸⁰ *Id.*

⁸¹ 33 CFR § 230.21.

⁸² 10 CFR § 1021.200(d).

⁸³ *Id.*

⁸⁴ 40 CFR § 1508.28.

⁸⁵ 40 CFR § 1502.21.

⁸⁶ *Environmental Review Guidance*, *supra* footnote 19, at 1-11.

⁸⁷ *Id.*

⁸⁸ *Id.*

⁸⁹ 77 FR 14479 (Mar. 12, 2012).

⁹⁰ *Id.*

Transportation.⁹¹ In upholding the environmental statement, the Eleventh Circuit affirmed the ability of federal agencies to utilize local planning documents in EISs, reiterated that documents incorporated by reference need not have been subject to NEPA analysis, and did not require the FHWA to republish the incorporated reports because they were already available to the public.⁹² Similarly, the Ninth Circuit upheld a U.S. Army Corps of Engineers EA that incorporated by reference hexavalent chromium analysis conducted by both the project applicant and a registered geologist hired as a consultant.⁹³ Because the EA cited publicly available data provided in the consultant’s memorandum, its contents exceeded mere “narratives of expert opinions.”⁹⁴ The U.S. Army Corps of Engineers therefore met NEPA’s requirements by citing to the incorporated analyses in its EA.⁹⁵

The NRC similarly encourages incorporating previous analyses by reference in both EAs and EISs.⁹⁶ Incorporated documents are often analyses prepared within the NRC, but also can include documents produced by other federal agencies or private actors. One notable example of incorporation by reference came in 2002. In preparing an EIS for a site-specific 10 CFR Part 72 license to store Peach Bottom spent nuclear fuel, the NRC used a section of the DOE’s generic EIS for management of high-level waste that pertained to the same location.⁹⁷ For example, an application for a COL must include an ER, but if the application proposes to use a manufactured reactor, the ER may incorporate by reference the EA previously prepared by the NRC for the underlying manufacturing license.⁹⁸ More generally, any supplement to a post-construction final EIS or EA may incorporate by reference “any information contained in a final environmental document previously prepared by the NRC staff that relates to the same production or utilization facility.”⁹⁹ The NRC appears to widely allow for incorporation by reference when applicants refer to prior studies subjected to NEPA analysis, but is silent on the validity of incorporating non-NEPA internal documents and documents prepared by outside actors.¹⁰⁰ The NRC should further expedite the NEPA review process by specifically codifying circumstances where EAs and EISs can reference externally prepared analyses.

4.3.3 Utilizing These Tools in Practice

Given the often-duplicative nature of NEPA reviews, heavier reliance on existing environmental analyses has the potential to save significant time and resources for both project applicants and the NRC. The NRC should highly prioritize efforts to expand the use of adoption, incorporation by reference, and tiering. These techniques are effective at streamlining projects and are already used by the NRC to a limited degree. Additionally, the NRC has practice tiering with respect to LRAs, decommissioning, and materials licensing. The NRC should consider developing a GEIS for advanced reactors which can serve as the basis for an EA or an EIS. The NRC could then focus on the specific environmental issues and incorporate by reference generic broader topics from the GEIS.

Furthermore, the NRC can expand its NEPA regulations to expressly encourage incorporation by reference of materials prepared externally by other agencies, outside experts, and other relevant

⁹¹ 669 F.3d at 1209.

⁹² *Id.* at 1211-12.

⁹³ *Jones v. National Marine Fisheries Service*, 741 F.3d 989, 993 (9th Cir. 2013).

⁹⁴ *Id.* at 998.

⁹⁵ *Id.*

⁹⁶ *Environmental Review Guidance*, *supra* footnote 19, at 1-11.

⁹⁷ *Id.*

⁹⁸ 10 CFR § 51.50(c)(3).

⁹⁹ 10 CFR § 51.95(a).

¹⁰⁰ See 10 CFR § 51.49(e); 51.60(a); 51.62(a); 51.75(c); 51.76(e); 51.92(e)(2); 51.103(c) (authorizing incorporation by reference of materials included in a previously conducted NRC environmental impact statement).

sources of information. Adopting these recommendations would put the NRC's NEPA requirements more closely in line with agencies like the DOE and the U.S. Army Corp of Engineers and could facilitate more expedient environmental reviews of major actions.

4.4 Incorporate into NRC regulations the flexibility to use the applicant's environmental report as the basis for the draft EA or EIS.

Agencies are required to publish for comment a NOI to prepare an EA or EIS. The NOI starts the scoping process during which the agency and public collaborate on issues and possible alternatives to be addressed in the EA or EIS. NRC regulations rely less on ERs than CEQ guidelines recommend, which slows approval for new projects. To streamline NRC's NEPA review process, it is prudent for the NRC to consider potential regulatory changes that require staff to consider using in whole, or in part, the ER as the draft environmental document. Much can be learned from other federal agencies such as FAA and FHWA, which delegate more of the environmental analysis to private applicants. An additional consideration is the cost. Preparation of the ER is an expensive endeavor for applicants and currently serves as the basis for preparation of the NRC's EIS. Unfortunately, as conducted to date, the NRC's EIS preparations duplicate the applicant's efforts to develop an ER, wasting time and level of effort, and resulting in costs that are then charged back to the applicant.

4.4.1 CEQ Guidelines on Delegation to Project Applicants

NEPA itself is silent on whether federal agencies can delegate the duty to prepare EISs to private actors.¹⁰¹ In 1981, CEQ addressed mounting confusion from agencies and applicants alike, creating a regulation authorizing the delegation of EAs and EISs to neutral contractors or private applicants provided the lead agency retains sufficient control over the preparation process.¹⁰² Courts are deferential to federal agencies' substantive NEPA analysis and have rarely disallowed such proposals.¹⁰³ In the absence of "bad faith reliance or misplaced reliance," agencies are allowed to incorporate all useful and relevant information—even when stemming from the applicant—into their analyses to maximize utilization of finite resources.¹⁰⁴ Agencies also need to independently verify delegated findings, but must only explain their methods enough to prove they reviewed the appropriate work.¹⁰⁵ This is a low standard; courts have only held that agencies failed to verify delegated findings when they (1) merely required the applicant to "consult" with various federal and state agencies about the impacts of a project, or (2) immediately published an applicant's ER for public comments without any further agency action.¹⁰⁶ These holdings indicate the NRC could offer much more deference to applicants' ERs while still complying with CEQ guidelines.

More recently, the CEQ proposed rule specifically recommends that agencies provide the applicant a greater role in preparing environmental documents. The proposal requires that the agency independently confirm all of the information, but it would eliminate redundancies and leverage the analysis applicants have already performed.

¹⁰¹ 40 CFR § 1506.5.

¹⁰² Guidance Regarding NEPA Regulations, 48 Fed. Reg. 34263 (July 28, 1983); See 40 CFR §1506.5(c).

¹⁰³ e.g., *Baltimore Gas and Electric Co. v. Natural Resources Defense Council, Inc.* 462 U.S. 87, 103 (1983); See also *Native Ecosystems Council v. Weldon*, 697 F.3d 1043, 1051 (9th Cir. 2012).

¹⁰⁴ 502 F.2d 43, 59 (citing CEQ Guidelines, 40 CFR § 1500.7(c)).

¹⁰⁵ See *Airport Impact Relief, Inc. v. Wykle*, 192 F.3d 197, 208 (1st Cir. 1999); *Lake Erie Alliance for Protection of Coastal Corridor v. U.S. Army Corps of Engineers*, 526 F.Supp. 1063, 1070 (W.D. P.A. 1981).

¹⁰⁶ See *State of Idaho By and Through Idaho Public Utilities Com'n v. I.C.C.*, 35 F.3d 585, 595 (D.C. Cir. 1994); *Illinois Commerce Com'n v. I.C.C.*, 848 F.2d 1246, 1258 (D.C. Cir. 1988).

4.4.2 NRC Environmental Reports

According to 10 CFR 51.50, each applicant is required to submit an ER with its application.¹⁰⁷ In 10 CFR 51.45(b) an “environmental report shall contain a description of the proposed action, a statement of its purposes, a description of the environment affected” and several additional considerations.¹⁰⁸ When an applicant files a request for action with the NRC, it must include an ER with information needed to conduct subsequent environmental analysis.¹⁰⁹ Once this information is received from an applicant, an NRC staff director determines whether the requested action qualifies for a categorical exclusion or requires an EA or EIS and publishes a scoping document for public comment.¹¹⁰ The staff director also determines whether the applicant’s information is sufficient to support the required environmental analyses.¹¹¹

Once the NRC staff has conducted a detailed evaluation of the applicant’s ER, existing guidance recommends that the EIS should be drafted. This presumes a determination that an EIS is always warranted. The Environmental Standard Review Plan (ESRP) guidance does not provide for the staff to incorporate “as is” an applicant’s environmental report either in whole or in part, where applicable. It is logical and appropriate to use the applicant’s environmental report as the draft EA or EIS. The applicant is required to submit a substantial amount of environmental analysis with its application and the NRC would gain additional efficiencies if it were to leverage the analysis and import it directly into the draft EA or EIS.

This recommendation has been considered by the courts as permissible as long as the agency retains sufficient control of, or responsibility for, the preparation process.¹¹² Further, it is in-line with proposed CEQ changes and would satisfy judicial review, so long as the NRC continues to independently conduct the environmental process, verify the accuracy of the report, and take ultimate responsibility for the document’s scope and contents.¹¹³

4.4.3 Best Practices from Other Agencies

The NRC can amend its regulations by looking to federal agencies that allow more applicant participation in the environmental review process. For instance, FERC allows applicants under the Natural Gas Act to prepare their own draft EA in addition to submitting a highly detailed ER.¹¹⁴ Rather than reviewing the ER and then preparing an EA, FERC staff accelerates review by analyzing and verifying the ER data to ensure it supports the draft EA, making appropriate adjustments and revisions, and developing recommendations as necessary to prepare a final EA.¹¹⁵ Applicants can only create a draft EA with prior approval from FERC staff and must agree to a joint timeline in advance of submitting any

¹⁰⁷ 10 CFR § 51.50, “Environmental report – construction permit, early site permit, or combined license stage.

¹⁰⁸ 10 CFR § 51.45(b)(1-5).

¹⁰⁹ Regulatory Guide 4.2, Rev. 3 *Preparation of Environmental Report for Nuclear Power Stations* (Sept. 2018); See NUREG-1748, *Environmental Review Guidance for Licensing Action Associated with NMSS Program*, Final Report, p. 1-6 (Aug. 2003).

¹¹⁰ Reg. Guide 4.2, Rev 3, at 2.

¹¹¹ 10 CFR § 51.45(c).

¹¹² *Sierra Club v. Lynn*, 502 F.2d 43, 59 (5th Cir. 1974) (“NEPA demands only that ‘the applicable federal agency must bear the responsibility for the ultimate work product designed to satisfy the requirements of § 102(2)(c).’ and ‘In the absence of bad faith or misplaced reliance, an agency faced with numerous applications for assistance and endowed with finite resources to implement congressional policy cannot be expected to ignore useful and relevant information merely because it emanates from an applicant.’”).

¹¹³ *Id.*; 40 CFR § 1506.5(a) and (b)(CEQ regulations allow for an agency to permit the applicant to prepare the environmental assessment as long as agency conducts independent evaluations and takes “responsibility for the scope and content of the environmental assessment”).

¹¹⁴ Federal Energy Regulatory Commission Office of Energy Projects, *Guidance Manual for Environmental Report Preparation*, 4-2 (Aug. 2002).

¹¹⁵ *Id.*

materials.¹¹⁶ FAA similarly accepts input from airport proprietors responsible for planning and developing facilities when they apply for projects. The agency cannot delegate core environmental responsibilities to other parties, but airport proprietors “provide most of the backbone airport planning information for the EIS” due to their technical knowledge of existing conditions in the airport vicinity.¹¹⁷ FAA also provides expedited environmental review processes to certain types of repeated projects to reduce delays and manage completion timelines.¹¹⁸ By preparing programmatic EAs and EISs to cover broad groups of related actions, FAA creates a framework to expedite subsequent project-specific environmental reviews.¹¹⁹

4.5 Reduce burdensome alternative site analyses by limiting the scope of the analyses to those that are realistic and within the NRC’s jurisdiction.

NEPA requires agencies to consider alternatives to the proposed action, including alternative sites, if appropriate. The “reasonable” alternatives analyzed must meet the purpose and need of the proposed project and serve to inform the agency of different ways to accomplish the same goal.¹²⁰ As the environmental impacts of each alternative must be considered in full,¹²¹ the scope of NEPA reviews greatly increases as more alternatives are considered. This is of particular concern with many proposed advanced reactors which may have unique service locations or purposes (e.g., supply process heat or remote power supply applications).

The Supreme Court has held that reasonable alternatives must be bound by some notion of feasibility.¹²² CEQ’s forty question guidance describes alternatives as those that are “practical or feasible from the technical and economic standpoint and using common sense.”¹²³ While existing guidance recommends that the agency consider those regardless of the desirability of the applicant, the CEQ has proposed a revised definition to reasonable alternatives that the NRC should consider. Reasonable alternatives should be analyzed with the lens of what is actually feasible, based on the purpose and need of the applicant’s goals and the agency’s statutory authority.¹²⁴ The proposed revisions would preclude alternatives outside of the agency’s jurisdiction “because they would not be feasible due to the agency’s lack of statutory authority to implement that alternative.”¹²⁵ The EIS need not include every available alternative nor should it reanalyze alternatives previously rejected. Implementing CEQ’s proposed change would allow the Commission to focus its review on alternatives that are actually feasible and those that realistically may be implemented by the applicant.

There are two would be project proponents for advanced reactors, governmental authorities and private corporations, both of whom, as a practical matter, are unlikely to change their business plan based on the NRC’s alternative analysis. Consider that: (1) if the impetus to increase or generate power reflects a governmental decision (for sites in which energy facilities are regulated by a public utilities commission or co-located on government property), the need for power analysis has already been

¹¹⁶ Federal Energy Regulatory Commission, Guidance for Applicant-Prepared Draft Environmental Assessments for Certain Proposed Natural Gas Projects (Apr. 28, 2011).

¹¹⁷ Best Practices for Environmental Impact Statement Management, FAA Guide (Jan. 2002).

¹¹⁸ Environmental Impacts: Policies and Procedures, U.S. Department of Transportation, Federal Aviation Administration (July 16, 2015).

¹¹⁹ *Id.*

¹²⁰ 40 CFR § 1502.14.

¹²¹ 40 CFR § 1502.14.

¹²² *Vt. Yankee*, 435 US at 551.

¹²³ CEQ Forty Questions, Question 2a, <https://www.energy.gov/nepa/downloads/forty-most-asked-questions-concerning-ceqs-national-environmental-policy-act>.

¹²⁴ 85 FR 1701.

¹²⁵ *Id.* at 1702.

performed by the government applicant; or (2) if the impetus to provide power, either electric or non-electric, is a private party decision, the project proponent would have already performed the analysis and will bear the risk on the need for power associated with the project.¹²⁶ Further, for many new reactor projects the selected site will be the only site available, for example it may be co-located with an existing generation source, providing heat to an industrial facility, or providing secure power to a Federal facility.

Through the process of soliciting input from those that have experience with NRC environmental reviews, the most frequent area for improvement identified by applicants concerned the alternative site analysis. Industry believes that by the time applicants are ready to submit an application for a new reactor, they have already completed their due diligence as a corporation regarding the best location to meet power generation needs, e.g., through resource planning and procurement processes. Significant resources are expended by both industry and the NRC in looking at alternative sites. Building a new generation facility is a costly endeavor, and the burden of additional NRC review costs (which have been as much as \$250,000 to \$350,000 for staff, bus rentals, hotels, and meals for travel to alternative sites) could be avoided by just summarizing the history and process used to formulate the reasonable alternatives.

For example, Southern Company and the NRC evaluated 13 initial sites and 10 different technologies other than nuclear power for the Vogtle 3 and 4 reactors, despite the fact that the preferred alternative for both siting and power generation was already an operating nuclear plant. The NRC recognized that a number of the generation alternatives were viewed as unreasonable, such as use of wood and municipal solid waste, and multiple power generation combinations, but staff time was still spent analyzing these sources. In addition, time spent during site visits and the accompanying detailed alternative site analysis was a double cost to the applicant, that is, first, the initial development of the information in the ER, and second, the NRC NEPA costs billed back to Southern Nuclear.

The concerns for advanced reactors are further amplified by recent reviews for the SHINE medical isotope facility. In spite of a statutory directive that licensing of medical isotope facilities be a national priority,¹²⁷ the discussion of alternative sites for the SHINE facility was nearly 100 pages in length, fully a quarter of the entire document. The construction permit EIS for the SHINE facility, which is not a power reactor, was nearly the same length as the EIS for both construction and operation of the Palo Verde Nuclear Plant in the 1980s.

In an evaluation of COLAs and the handling of alternative sites, it is clear that this area of impact assessment needs revision. The site selection process, comparison of environmental impact alternatives, site tours during the audit, and RAI responses all consume extensive resources for both the applicant and the NRC. A summary of site selection statistics is provided in Table 1. Again, the entire alternative site analysis process as documented in an application represents completion of the applicant's due diligence regarding the best location to meet power generation needs. 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.

¹²⁶ Additionally, as advanced reactors are smaller (typically less than 300 MWe), the impact they have on the existing power grid is substantially smaller than adding one or more gigawatt sized reactors, thus obviating the need to conduct the analysis. Similarly, for non-power applications, such as process heat and desalinization, the market would make the decision regarding whether to use nuclear technology and, if so, what type should be used.

¹²⁷ NNSA. Office of Material Management and Minimization. Molybdenum-99 (Mo-99) program.

Table 1: Summary of Site Selection Information

Site	Initial #	Final #	Name / Type of Site	Ownership
LEE ^{128,129}	6 Candidate Areas with 17 Potential Sites in the Candidate Areas	4 Candidate Sites included in final evaluation	Lee – Industrial (previously Cherokee Nuclear Site)	Duke Energy
			Keowee (greenfield)	Duke Energy
			Perkins (greenfield, but previously a potential nuclear site)	Duke Energy
			Middleton Shoals Site – (greenfield)	Duke Energy
LEVY ¹³⁰	20 potential sites were initially located in 14 different counties pg. 9-55	Initial sites reduced to 8 top-ranked Candidate Sites pg. 9-56 Reduced to 5 proposed sites pg. 9-66	Crystal River (industrial, nuclear)	Florida Power Corporation
			Levy (agricultural, forested) pg. 1-2	Progress Energy Florida, Inc. pg. 1-2
			Dixie (agriculture, forested, and residential)	Private land
			Highlands (agriculture)	Private land
VC SUMMER ¹³¹	2 nuclear sites and 18 other sites were potential sites pg. 9.3-4 9 of these initial sites were eliminated on initial screen to provide an 11 potential site screening effort pg. 9.3-11	4 highest Candidate Sites subjected to final detailed analysis pg. 9.3-13	VC Summer (nuclear)	South Carolina Electric and Gas pg. 9.3-14
			Savannah River (nuclear)	Federal Government (DOE) pg. 9.3-16
			Saluda (forested, undeveloped)	South Carolina Electric and Gas pg. 9.3-54
			Cope (Existing coal-fired generation site, agricultural, forest) pg. 9.3-14, 9.3-34, 9.3-54	South Carolina Electric and Gas pg. 9.3-35
VICTORIA COUNTY STATION ¹³²	Initially 22 potential sites were considered. 2 existing	5 Candidate Sites selected for detailed analysis pg. 9.3-9	Buckeye – Matagorda County (Agricultural) pg. 9.3-30	Private Land - Exelon

¹²⁸ William States Lee III Nuclear Station COL Application Environmental Report, pages 9.3-3 through 9.3-5.

¹²⁹ Supplement to Revision 1 of the William States Lee III Nuclear Station COL Application Environmental Report, pages 9-1 through 9-12.

¹³⁰ Levy Nuclear Plant Units 1 and 2 COL Application Part 3, Environmental Report, pages 9-55 through 9-90.

¹³¹ South Carolina Electric & Gas COL Application Part 3 – Environmental Report, VC Summer, pages 9.3-11 through 9.3-95.

¹³² Victoria County Station, Units 1 and 2 COL Application Part 3 – Environmental Report, pages 9.3-4 through 9.3-76.

	nuclear sites were eliminated. pg. 9.3-4		Green – Matagorda County (Agricultural) pg. 9.3-11	Private
			McCan – Victoria County (Agricultural)	Private
			Alpha – Austin County (Agricultural) pg. 9.3- 47	Private
VOGTLE¹³³	Initial potential sites include 13 existing Southern Company plant sites (3 nuclear, 1 nuclear Greenfield, 9 coal plants) pg. 9-28	List screened to 4 candidate sites pg. 9-29	Farley (Nuclear, forested)	Southern Company
			Hatch (Nuclear, agricultural)	Southern Company
			Barton (Greenfield, nuclear, forested)	Southern Company
			Vogtle (Nuclear)	Southern Company

Further, in the NRC regulatory guide on preparing ERs, the NRC acknowledges the unique nature of licensing an SMR or non-LWR.¹³⁴ The guidance to applicants is that “the amount of information needed for an SMR or a non-LWR would depend on application specific factors such as the size of the reactor, its footprint, and the amount of resources it uses (e.g., water), the purpose and need for the proposed action, reasonable alternatives, the need for power, benefit-cost, and the design differences between SMRs, non-LWR, and LLWRs.”¹³⁵ At the same time, the guidance also indicates that SMRs and non-LWRs should follow the same guidance as LLWRs in preparing their ER. Even further, the NRC indicates in the alternative site analysis that an SMR is expected to require a smaller site footprint than an LLWRs, which is likely to lead to a larger set of potential sites required in the site-selection process. The NRC does not give any evidence to why that is, but one can assume that because SMRs are smaller they can fit more places. That is not the test for determining alternative sites. In the paragraph directly following, the NRC says that even if the SMR is intended to provide secure energy for the military, government, or critical industrial facilities, the applicant must still submit alternative sites. This logic would ignore, in the proceeding example, the purpose for which the SMR is being built and require the applicant to delve into a useless exercise for locations the plant will never go, even if approved.

4.6 Increase the efficiency of environmental reviews through targeted process improvements

Consistent with the NRC Principles of Good Regulation and organizational values, the agency strives for efficiency and continuous learning.¹³⁶ In recent efforts to identify and incorporate lessons learned there has been significant reflection on the 10 CFR Part 52 process and the safety focus of new reactor regulatory reviews.^{137, 138} While the environmental review has a different focus, consistent with NEPA,

¹³³ Final Environmental Impact Statement for an Early Site Permit (ESP) at the Vogtle Electric Generating Plant Site, NUREG-1872, Vol. 1, pages 9-28 through 9-84.

¹³⁴ Regulatory Guide 4.2, Rev. 3, *Preparation of Environmental Report for Nuclear Power Stations* (Sept. 2018).

¹³⁵ Regulatory Guide 4.2, Rev. 3, Appendix C, p C-1, *Preparation of Environmental Report for Nuclear Power Stations* (Sept. 2018).

¹³⁶ <https://www.nrc.gov/about-nrc/values.html>, Accessed January 14, 2020.

¹³⁷ SECY 19-0084, Status of Rulemaking to Align Licensing Processes and Lessons Learned from New Reactor Licensing, ADAMS Accession Number ML19161A169.

¹³⁸ Recommendations for Enhancing the Safety Focus of New Reactor Regulatory Reviews. Nuclear Energy Institute (2018).

many of the procedural efficiencies identified for the safety review should also be considered to increase the efficiency of environmental reviews. Using the context of NEPA requirements, Appendix A recommends other actions to streamline the NRC's environmental review process in the areas of pre-application interactions, audits, requests for additional information and consultations with other agencies. Additionally, Appendix B identifies contributing factors that once addressed in the environmental review context should help achieve and sustain increased efficiency.

APPENDIX A: INCREASE THE EFFICIENCY OF ENVIRONMENTAL REVIEWS THROUGH TARGETED PROCESS IMPROVEMENTS

The NRC recognizes that advanced reactors have characteristics such as size, resource usage, and design simplicity that affect the scope and detail of the environmental review. As such, the NRC intends to seek opportunities to increase productivity in review procedures.¹³⁹ Recommendations provided in subsequent sections are based on both the NEI Recommendations for Enhancing the Safety Focus of New Reactor Regulatory Review and industry feedback in the context of environmental reviews.

1. Improve effectiveness and efficiency of pre-application meetings.
2. Increase efficiencies in environmental audits.
3. Strengthen the discipline of the use of requests for additional information with regulatory requirements.
4. Improve timeliness and efficiency of agency consultations.

A.1. Improve Effectiveness and Efficiencies in Pre-Application Meetings

Pre-application meetings with applicants are expected to create a common baseline for NRC staff and industry on expectations for the ER content. In general, NRC staff have discussed lessons learned from prior COLAs, ESPAs, and LRAs reviewed to date. This is also an opportunity for applicants to present any challenges expected for their site. Another central item identified by applicants as important to address at pre-application meetings is the early development and adherence to schedule. This issue was also mentioned as an area for improvement during a discussion of environmental audits. NEI 18-06, “Guidelines for Development of a Regulatory Engagement Plan,” is one available tool for capturing applicant expectations and facilitating alignment with NRC for the application in question.

Pre-application activities could be improved when a COL applicant already has an ESP. The ESP is intended to be technology independent and therefore applicants should be able to take more credit for the issues resolved in the ESP. Feedback from industry has indicated that this has not necessarily been the case, and there was much repetition in the COLA that should have been considered resolved in the ESP.

Pre-application meetings should be established between applicants, the NRC, and other regulatory authorities early in the process to ensure that all parties have a clear understanding of project attributes, scope of the review, potentially significant issues, and the schedule. This would also serve to support agency consultations that formally begin later in the process.

A.2. Increase Efficiencies in Environmental Audits

The audit process is designed to reduce the number of RAIs and result in a more efficient, less costly review. Therefore, the audit process and the RAI process are directly connected. Most audits are generally a week or less in length, very focused, with the final report and supporting conclusions issued shortly after the close of the audit. The NRC took a slightly different approach with the Clinch River ESP,

¹³⁹ NRC Presentation, “Preparation for Advanced Reactors Environmental Reviews, Including Integration of NEPA Processes” (March 2019) <https://www.nrc.gov/public-involve/conferencesymposia/ric/past/2019/docs/abstracts/cushingj-w23-hv.pdf>

using a focused approach with three week-long audits, each with a specific focus: seismic, hydrology, and environmental. This allowed the NRC to resolve questions during the audit, resulting in only a single RAI for the ER.

Audit experiences where there are areas that could benefit from additional NRC management oversight and process controls include NRC staff and contractors being unfamiliar with the relevant portion of the application prior to the audit. These issues result in unnecessary expenditure of resources and numerous schedule interruptions as considerable time is spent pointing out the appropriate sections in the application where questions being asked were already addressed, and attempting to reconvene with absent team members. One solution could be the extension of the NRC's recent implementation of "core teams" for the safety review of advanced reactors to the environmental review.

Early and frequent communication is essential prior to and during the onsite audit, particularly with respect to documents to be made available, site tour preparations, and other applicant preparations as required. Differences in interpretation of the guidance, as was seen with the NEI 17-04, "Model SLR New and Significant Assessment Approach for Severe Accident Mitigation Alternatives (SAMA)" during recent SLR audits, resulted in the NRC and industry continuing to engage on resolutions to improve the review process and documentation needs for SAMA. Actions initiated by the NRC as a result of these lessons learned include:

- Finalizing pre-submittal guidance tables.
- Summarizing benefits of additional communications to ensure appropriate technical staff are available at audits.

As these actions are implemented, advanced reactor applicants will also benefit.

A.2.1. Recommended Enhancements

- Ensure audit staff from both the NRC and their contractors have developed a concise scope and audit schedule based explicitly on defined sections of the application.
- Transmit the scope, audit schedule, and documents requested to be available well in advance of the audit.
- All identified scope elements must be directly tied to a regulatory requirement to reduce the risk of audit scope creep. Any proposed changes to the scope after it has been finalized should be handled as a documented, tracked revision with an explanation of why the change was needed.
- For multiple or longer audits similar to those conducted for the Clinch River ESP, interim milestones and reports must be provided to appropriately track and document progress.

A.3. Strengthen the Discipline of the use of Requests for Additional Information with Regulatory Requirements

As discussed in previous sections, pre-application activities and audits can minimize the number of RAIs during the application review process. However, the NRC can improve its management system for RAIs to enhance project knowledge and contribute to a more efficient, informed review. Improving the RAI

database searchability may serve to limit the number of commonly asked RAIs which solicit similar responses, and ensure RAIs are tracked consistently across divisions.

There have been instances in which RAIs have been issued that were duplicative or not relevant to an application. This resulted in unnecessary expenditure of resources for both the NRC and the applicant. This was also identified as an issue in the new reactor licensing lessons learned; the report stated that review challenges are “often exacerbated when multiple rounds of RAIs and responses result in little progress toward resolution.” The lesson learned is that both NRC staff and the applicant need to identify these situations and elevate them so that the specific areas of disagreement can be identified and addressed.

A.3.1. Considerations

- Prior to issuance of a RAI, NRC staff needs to verify that the requested information has not already been addressed to eliminate unnecessary expenditure of resources addressing items for which the information is already readily available.
- Information that is already presented in the final safety analysis report/preliminary safety analysis report should not be included as a RAI for the ER.
- RAIs should specify the information missing in the application and include the specific requirement associated with either guidance or regulations.
- Technical acceptance criteria for RAI responses should be included with the RAI and must be based on specific regulatory requirements.

In general, RAI responses are due within 30 days. The NRC should also be required to provide feedback on the response within 30 days.

A.4. Improve Timeliness and Efficiency of Agency Consultations

Applicants have no control over the length of time it takes for an agency to respond to a request for consultation on a NEPA review. In one instance, the NRC did not consult with the U.S. Fish and Wildlife Service (USFWS) until nearly the end of the review process. The USFWS subsequently required a new study be performed on the pallid sturgeon, resulting in another full year of field work in a river with very low flow rates, delay in issuance of the license, and an additional \$1M in cost. This requirement to conduct additional studies is an example of agencies using the NEPA process as a way to conduct scientific research at the expense of the applicant, with no direct link to a regulatory requirement.

Many applicants have commented that the NRC tries to be very accommodating to other agencies, which in turn prolongs the review. For future reviews the NRC should begin consultation early in the process and ask other agencies about their expectations for the review. This is especially important with the National Marine Fisheries Service and USFWS, who tend to provide a standard response – without consideration of the specific project – until the NRC initiates formal consultation. In one case in the Midwest, the regional USFWS office already had a requirement to collect data on a specific freshwater species; this was completed, and follow-up monitoring was not required until after the application decision had been made. The NRC decided to delay action on the application for two additional months while awaiting final results. This delay could have been avoided if consultation had begun earlier and an

understanding had been reached in advance of how the data collection and analysis would fit into the schedule.

One additional consideration concerns the Section 7 consultation required under the Endangered Species Act. Preparation of the biological assessment requires close coordination with USFWS and the National Marine Fisheries Service to ensure that effects from proposed licensing actions on threatened and endangered species are included. Timing is critical in making sure the technical content of the biological assessment is completed to the satisfaction of regulatory agencies and meets the schedule for the FEIS. Section 7 consultations will also need to adapt to expedited review requirements specified in FAST-41.

APPENDIX B: CONTRIBUTING FACTORS TO BURDENSOME ENVIRONMENTAL REVIEWS

Over time it is evident that the NRC is requiring greater levels of detail in submittals, beyond what is required by NEPA. This increasing level of detail in the information to be provided has resulted in increased level of effort and resources for the applicant and longer NRC review times and increases the potential for additional RAIs not needed for regulatory decision-making.

B.1. Efficient Decision-Making

More efficient and disciplined decision-making by the NRC is recommended. Significant resources are often expended ensuring that differing views are heard and dispositioned respectfully and efficiently. Obtaining consensus, which is different than unanimous agreement, must be balanced with technical decision-making.

NRC performance of acceptance reviews have recently become a concern. The regulatory standard for determination of sufficiency is that the information provided must be adequate to conduct the technical review. With the recent SLR submittals, there was a lot of back and forth on which issues should be raised as sufficiency items.

Industry expressed that some sufficiency review issues were tied to the NRC's review schedule, and the acceptance review often became the beginning of the technical review of the application. Considerable applicant and NRC resources were expended to resolve whether an online portal or reading room should be opened during acceptance review, in either full or limited form. Pre-application meetings should be used to clarify expectations on the environmental content requirements of the application for acceptance and appropriate supporting documentation provided in the online portal during the conduct of the technical review.

B.2. Commitment to Risk-Informed Regulation

The Commission has long embraced the use of risk-informed regulation, and existing guidance provides the staff with flexibility to consider risk during their review. The use of risk, however, can be further enhanced and better utilized when performing reviews of environmental considerations for advanced reactors. Staff resources are not always allocated to issues commensurate with their environmental significance. Industry has noted that some staff do not give appropriate consideration of environmental risk and have in many cases remained deterministic in their reviews regardless of environmental benefits.

Improvements to the environmental reviews are needed to prevent unnecessarily impeding the deployment of innovative new reactor technologies. Consideration of low-risk, high-consequence events that pose significant health and environmental impacts have already been internalized for the nuclear industry. For example, a description of the design specific probabilistic risk assessment and its results are required for new license applications.¹⁴⁰ This requirement may obviate the need for a separate evaluation of severe accident mitigation alternatives (SAMAs) in the environmental review. As advanced

¹⁴⁰ 10 CFR 52.47 (a)(27).

reactor applicants will have specific needs in specific locations, environmental reviews will need to focus on significant, relevant issues.

B.3. Environmental Focus of Advanced Reactor Environmental Reviews

The NRC wrote the interim staff guidance for NUREG-1537 using a conservative approach that would cover a range of potential technologies and construction methods. As stated, certain data needs may not be applicable for all applications. NUREG-1555, Standard Review Plans for Environmental Reviews for Nuclear Power Plants, would benefit from similar updates. Information provided in the ER should discuss the potential for significant impacts to the human environment posed by the proposed action. Consistent with the provisions set forth in 10 CFR 51.45(b)(1), impacts should be discussed in proportion to their significance. For example, construction and operation of a new nuclear facility at a previously undisturbed site near sensitive environmental resources would require more detail than construction and/or modification and operation of a facility within an existing building at an industrial site.

The ER should present a description commensurate with the potential impact to each affected resource area for the evaluation of potential impacts to the environment. It may not be necessary for every resource to receive the same level of detailed review, and every action may not require all the information discussed in this section. Likewise, the proposed action may present unique issues and may require additional information. This is consistent with one of the goals of NEPA, which is to concentrate on issues significant to the proposed action and their potential environmental impacts, and further, that affected resources are analyzed in proportion with their importance and the expected level of impact to them.

B.4. Incorporate Lessons Learned

Industry and regulators, including the NRC, have many years of experience in the siting and operation of nuclear power plants, and lessons learned should be incorporated into an improved regulatory framework. The timing is appropriate, as the CEQ is already evaluating updates to its regulations for the first time in 30 years. While the NRC issued Regulatory Guide 4.2 Revision 3, “Preparation of Environmental Reports for Nuclear Power Stations” in September 2018, Appendix C does not go far enough in streamlining advanced reactor and SMR environmental reviews. Development and implementation of process improvements from lessons learned in all areas of NRC review, including those from the NRC’s reflection on the conduct of safety reviews, should also be applied to the benefit of environmental reviews.¹⁴¹

¹⁴¹ Recommendations for Enhancing the Safety Focus of New Reactor Regulatory Reviews. Nuclear Energy Institute (2018).