REGULATORY ANALYSIS

DRAFT REGULATORY GUIDE DG-4034
GENERAL SITE SUITABILITY CRITERIA FOR NUCLEAR POWER STATIONS
(Proposed Revision 4 of Regulatory Guide 4.7)

1. Introduction

This document analyzes the determination by the U.S. Nuclear Regulatory Commission (NRC) regarding whether it should expend resources to revise Regulatory Guide (RG) 4.7, "General Site Suitability Criteria for Nuclear Power Stations." It considers the potential benefits and costs to the NRC and stakeholders. It does not consider the cost of implementation by existing licensees since this guide is for applicants of new commercial nuclear power plants. Furthermore, the cost of implementation by licensees was covered by the regulatory analysis done for the rule(s) upon which the guide is based.

2. Statement of the Problem

The NRC published Revision 3 of RG 4.7 in March 2014; it describes a method the NRC considers acceptable to implement the site suitability requirements for nuclear power stations. The current version of RG 4.7 (Revision 3) does not reflect the NRC's implementation of a risk-informed, performance-based approach to licensing.

Since the issuance of Revision 3 of RG 4.7, alternative approaches to the population-density criterion have been developed for non-light-water-reactor (non-LWR) technology and light-water small modular reactors (SMRs). The NRC staff is considering revising RG 4.7 to support licensing for non-LWR technology and light-water SMRs by providing alternatives to the population-density criterion based on estimates of radiological consequences from design-specific events and to provide additional methods that applicants can use to meet the siting requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 100.21(h) to ensure consistency in new reactor licensing reviews and promote a more effective and efficient licensing process.

The NRC staff interacted with stakeholders to develop several options for the Commission's consideration to address population-related siting questions for advanced reactors. The options developed, along with their advantages and disadvantages are detailed in SECY-20-0045 "Population-related Siting Considerations for Advanced Reactors" (ADAMS Accession No. ML19143A194). The NRC Commissioners provided their selected option and associated direction to the staff in a Staff Requirements Memorandum (SRM) to SECY-20-0045 (ADAMS Accession No. ML22194A885).

3. Objective

The objective of this regulatory action is to assess the need to update the NRC guidance and provide applicants with alternatives to demonstrate compliance with 10 CFR100.21(h) in determining the suitability of siting commercial non-LWRs and light-water SMRs closer to population centers than has typically been permitted for large LWRs.

4. Identification and Analysis of Alternative Approaches

The NRC staff considered the following alternative approaches:

(1) Do not revise Regulatory Guide 4.7 and maintain the status quo with no changes to the existing guidance in RG 4.7.

(2) Withdraw Regulatory Guide 4.7.

(3) Revise Regulatory Guide 4.7 to provide siting density guidance for siting of non-LWR technology and light-water SMRs.

Alternative 1: Do Not Revise Regulatory Guide 4.7

Under this alternative, the NRC would not revise or issue additional guidance, and the current guidance would be retained. If the NRC does not take action, there would be no changes in costs or benefits to the public or the NRC. This alternative is considered the "no-action" alternative and provides a baseline condition from which any other alternatives will be assessed. However, the "no-action" alternative would not support licensing for non-LWRs and light-water SMRs.

Alternative 2: Withdraw Regulatory Guide 4.7

Under this alternative, the NRC would withdraw RG 4.7. This would eliminate the only readily available guidance to assist applicants in the initial stage of selecting potential sites for a nuclear power station. Although this alternative would be less costly than revising the guide to address identified issues, it would leave stakeholders without guidance to address given regulatory requirements.

Alternative 3: Revise Regulatory Guide 4.7

Under this alternative, the NRC would revise RG 4.7. This revision would address the problems identified above regarding the use of alternative population-density criteria for the siting analysis of non-LWRs and light-water SMRs. By doing so, the NRC would ensure that the guidance available in this area is current and accurately reflects the staff's position.

The impact on the NRC would be the costs associated with preparing and issuing the RG revision. The impact on the stakeholders would be the voluntary costs associated with reviewing and providing comments to the NRC during the public comment period. The value to the NRC staff and its applicants would be the benefits associated with enhanced efficiency and effectiveness in using a common guidance document as the technical basis for license applications and other interactions between the NRC and its regulated entities.

5. Comparison of Alternatives

The NRC compared the alternatives against each other with respect to safety and the NRC's and applicants' resources.

With respect to safety, Alternatives 1 and 2 do not signify unsafe results since applicants would adopt methods that would be evaluated by NRC staff on a case-specific basis to establish a finding of reasonable assurance of adequate protection of the public health and safety.

Alternative 3 would be superior to Alternatives 1 and 2 in that the NRC would issue a revised siting RG to include alternative approaches to address population-related siting considerations thereby maintaining and potentially enhancing safety, improving clarity, and increasing uniformity in application reviews.

With respect to NRC resources, Alternative 3 represents the greatest initial cost to the NRC, which is attributable to the costs associated with preparing and issuing the RG. However, over the lifetime of the RG, the NRC staff estimates that the overall NRC cost of Alternative 3 is less than the overall cost of Alternative 1 due to the reduction in staff resources and schedule impacts associated with application reviews and requests for additional information (RAI) procedures. Alternative 2 is potentially the most expensive alternative for the NRC and applicants because, in the absence of NRC guidance, applicants would lack methods that the NRC staff has already approved for meeting a given set of regulations. In this case, applicants would need to develop their own methods for alternative approaches to address population-related siting considerations and demonstrate their effectiveness to the NRC. The NRC staff would be burdened by reviewing alternative methods, and this may result in issuing multiple RAIs to applicants that would in turn increase the review burden on staff and might impact schedules.

With respect to applicants' resources, Alternative 3 results in the least cost when compared to Alternatives 1 and 2. Having a revised RG should reduce the need for RAIs and therefore the need for applicants to perform additional analyses to address them. Accordingly, costs to applicants associated with these additional activities are estimated to be lower with Alternative 3 than Alternative 1. Alternative 2 would be the most expensive alternative because eliminating the RG would require applicants to develop their own methods for damping criteria and demonstrate their effectiveness to the NRC, thereby increasing costs for applicants.

6. Decision Rationale

Based on this regulatory analysis, the NRC staff concludes that a revision of RG 4.7 is warranted. The action will address the problems identified above regarding the use of alternative population-density criteria for the siting analysis of non-LWRs and light-water SMRs. It could also lead to cost savings for the industry, especially with regard to an applicant's ability to prepare submittals to the NRC. An updated guide would potentially reduce staff review time and the need for RAIs, thus reducing costs to applicants and the NRC. The costs to the NRC in revising the RG and applicants in adapting to a revised RG are deemed to be less than the benefits accrued by reducing the need for RAIs. The results of this analysis is consistent with SRM to SECY-20-0045 in which the Commission selected Option 3, to revise the guidance in RG 4.7 that relates to 10 CFR 100.21(h) to include provisions for advanced reactor designs.