



REGULATORY GUIDE

OFFICE OF NUCLEAR REGULATORY RESEARCH

REGULATORY GUIDE 1.217

(Draft was issued as DG-1176, dated July 2009)

GUIDANCE FOR THE ASSESSMENT OF BEYOND-DESIGN-BASIS AIRCRAFT IMPACTS

A. INTRODUCTION

This regulatory guide (RG) describes a method that the staff of the U.S. Nuclear Regulatory Commission (NRC) considers acceptable for use in satisfying the regulations at Title 10, of the *Code of Federal Regulations*, Part 50, “Domestic Licensing of Production and Utilization Facilities” (10 CFR Part 50) (Ref. 1), regarding the consideration of aircraft impacts for new nuclear power reactors. In particular, this RG endorses the methodologies described in the industry guidance document, Nuclear Energy Institute (NEI) 07-13, “Methodology for Performing Aircraft Impact Assessments for New Plant Designs,” Revision 8, dated April 2011 (Ref. 2). The public version of NEI 07-13 can be found under Agencywide Documents Access and Management System (ADAMS) Accession No. ML111440006. Publicly available documents created or received at the NRC are available electronically at the NRC Library on the internet at <http://www.nrc.gov/reading-rm/adams.html>. From this page, the public can enter the ADAMS database, which provides text and image files of the NRC’s public documents. Persons who do not have access to ADAMS, or who encounter problems in accessing the documents located in ADAMS, may contact the reference staff in the NRC’s Public Document Room by telephone at 1-899-397-4209 or 301-415-4737, or by e-mail at pdr.resource@nrc.gov. Non-public versions of this RG and NEI 07-13 contain more specific details about the methodology used in performing aircraft impact assessments and will be handled under Safeguards Information (SGI) controls. Because the nonpublic guidance documents will contain SGI, the documents will only be made available to those individuals who have a need to know and who are otherwise qualified to access SGI. Plant designers (including their

The NRC issues regulatory guides to describe and make available to the public methods that the NRC staff considers acceptable for use in implementing specific parts of the agency’s regulations, techniques that the staff uses in evaluating specific problems or postulated accidents, and data that the staff needs in reviewing applications for permits and licenses. Regulatory guides are not substitutes for regulations, and compliance with them is not required. Methods and solutions that differ from those set forth in regulatory guides will be deemed acceptable if they provide a basis for the findings required for the issuance or continuance of a permit or license by the Commission.

This guide was issued after consideration of comments received from the public.

Regulatory guides are issued in 10 broad divisions: 1, Power Reactors; 2, Research and Test Reactors; 3, Fuels and Materials Facilities; 4, Environmental and Siting; 5, Materials and Plant Protection; 6, Products; 7, Transportation; 8, Occupational Health; 9, Antitrust and Financial Review; and 10, General.

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employees and agents) who meet the NRC's requirements for access to SGI will be entitled to use the more detailed guidance documents to perform the aircraft impact assessments.

This regulatory guide contains information collection requirements covered by 10 CFR Part 50 that the Office of Management and Budget (OMB) approved under OMB control number 3150-0011. The NRC may neither conduct nor sponsor, and a person is not required to respond to, an information collection request or requirement unless the requesting document displays a currently valid OMB control number. This regulatory guide is a rule as designated in the Congressional Review Act (5 U.S.C. 801–808). However, the NRC has determined this regulatory guide is not a major rule as designated by the Congressional Review Act and has verified this determination with the OMB

B. DISCUSSION

Background

In 2009, the NRC amended its regulations to require applicants for new nuclear power reactors to perform a design-specific assessment of the effects of the impact of a large, commercial aircraft on the facility (74 FR 28111; June 12, 2009) (Ref. 3). The requirements affected or adopted by this rulemaking include 10 CFR 50.8, “Information Collection Requirements: OMB Approval”; 10 CFR 50.34, “Contents of Applications; Technical Information”; 10 CFR 50.150, “Aircraft Impact Assessment”; 10 CFR 52.47, “Contents of Applications; Technical Information” (Ref. 4); 10 CFR 52.59, “Criteria for Renewal”; 10 CFR 52.79, “Contents of Applications; Technical Information in Final Safety Analysis Report”; 10 CFR 52.137, “Contents of Applications; Technical Information”; and 10 CFR 52.157, “Contents of Applications; Technical Information in Final Safety Analysis Report.”

The NRC believes that it is prudent for nuclear power plant designers to take into account the potential effects of the impact of a large, commercial aircraft. The NRC has determined that the impact of a large, commercial aircraft is a beyond-design-basis event, and that NRC requirements that apply to the design, construction, testing, operation, and maintenance of design features and functional capabilities for design-basis events will not apply to design features or functional capabilities selected by the applicant solely to meet the requirements of the aircraft impact rule. The NRC's approach to aircraft impacts is consistent with its previous approach to beyond-design-basis events. The objective of the aircraft impact rule is to require nuclear power plant designers to rigorously assess their designs to identify design features and functional capabilities that could provide additional inherent protection to withstand the effects of an aircraft impact. The NRC expects this rule to result in new nuclear power reactor facilities that are inherently more robust with regard to an aircraft impact than if they were designed in the absence of the aircraft impact rule. The rule provides an enhanced level of protection beyond that which is provided by the existing adequate protection requirements applicable to currently operating power reactors.

The aircraft impact rule applies to applicants for new construction permits (CPs); new operating licenses that reference a new CP; new standard design certifications (DCs); the renewal of any of the four existing DCs, if the design has not previously been amended to comply with the final rule; new standard design approvals (SDAs); manufacturing licenses that do not reference a standard DC or SDA, or that reference a standard DC that was issued before the effective date of the rule and has not been amended to comply with the rule; and combined licenses that do not reference a standard DC, SDA, or manufactured reactor, or that reference a standard DC issued before the effective date of the rule, which has not been amended to comply with the rule. All of these applicants, as a whole, are referred to as “applicants for new nuclear power reactors.” The aircraft impact rule requires these applicants to assess the effects on the designed facility of the impact of a large, commercial aircraft. Using realistic analyses, applicants

must identify and incorporate into the design those design features and functional capabilities to show, with reduced use of operator action, that the reactor core remains cooled or that the containment remains intact and spent fuel cooling or spent fuel pool integrity is maintained (referred to as “the acceptance criteria”).

The aircraft impact rule does not require applicants to submit the aircraft impact assessment to the NRC in their applications. However, the assessment will be subject to inspection by the NRC; therefore, it must be maintained by the applicant. Applicants are required to describe, in their preliminary or final safety analysis reports, the design features and functional capabilities that show that the facility can withstand the effects of the aircraft impact. Applicants must also include a concise description of how such design features and functional capabilities meet the acceptance criteria of the rule. Applicants and licensees are also subject to requirements for the control of changes to the design features and functional capabilities identified as a result of complying with the aircraft impact rule.

From 2007 to 2010, the NRC staff reviewed and commented on the NEI 07-13 guidance document to ensure that the guidance did identify an approach that would be sufficient for applicants or licensees to demonstrate compliance with the aircraft impact rule. These reviews resulted in several revisions to the guidance document. During 2010 NRC staff conducted both open and closed public meetings with external stakeholders to assess the lessons-learned from completed aircraft impact assessment evaluations. In addition, the Advisory Committee for Reactor Safeguards reviewed and commented upon the guidance documents addressing aircraft impact assessments. In April 2011, the Nuclear Energy Institute, NEI, accepted and integrated these staff comments with Revision 08 to NEI 96-07, which was submitted to the NRC for endorsement as an acceptable method for satisfying the NRC’s regulations at 10 CFR 50.150(a).

The NRC staff has reviewed the NEI guidance document, NEI 07-13, Rev. 8, and determined that it describes an acceptable approach for assessing the effects of the impact of a large, commercial aircraft on a nuclear power plant. The guidance document discusses the characteristics of the large commercial aircraft to be assumed in the required assessment, the locations within the plant to be assessed, the damage mechanisms to be considered, and the assessment outcomes considered to be acceptable. The guidance document describes acceptable methods to determine the scenarios that need to be considered for the aircraft impact, acceptable methodologies to determine structural, shock, fire and component damage, and the potential for resulting nuclear fuel damage. The guidance document considers relevant redundancies, passive features, and defense-in-depth attributes, including consideration of equipment functionality, reliability, and availability. The guidance document also ensures appropriate consideration of the actual design, construction, and operational practices of the plant. Appropriate acceptance guidelines for evaluating the results of such assessments are also provided. The guidance document also describes an acceptable level of documentation that will enable the staff to review the assessment. For these reasons, the NRC staff believes that the NEI guidance document, NEI 07-13, Rev. 8, provides an acceptable method for use in satisfying the NRC’s regulations at 10 CFR 50.150(a).

C. REGULATORY POSITION

1. The NRC staff (staff) considers conformance with the guidance in NEI 07-13, Revision 8, an acceptable method for use in satisfying the NRC’s requirements in 10 CFR 50.150(a) regarding the assessment of aircraft impacts for new nuclear power reactors.
2. NEI 07-13 references other documents, but this RG does not endorse any of the referenced documents.

3. Licensees or applicants may use methods other than those provided in NEI 07-13, Revision 8, to meet the requirements of 10 CFR 50.150(a). The staff will review such methods and determine their acceptability on a case-by-case basis.

D. IMPLEMENTATION

The purpose of this section is to provide information on how applicants and licensees¹ may use this guide and information regarding the NRC's plans for using this regulatory guide. In addition, it describes how the NRC staff complies with the Backfit Rule (10 CFR 50.109) and any applicable finality provisions in 10 CFR Part 52.

Use by Applicants and Licensees

Applicants and licensees may voluntarily² use the guidance in this document to demonstrate compliance with the underlying NRC regulations. Methods or solutions that differ from those described in this regulatory guide may be deemed acceptable if they provide sufficient basis and information for the NRC staff to verify that the proposed alternative demonstrates compliance with the appropriate NRC regulations. Current licensees may continue to use guidance the NRC found acceptable for complying with the identified regulations as long as their current licensing basis remains unchanged.

Licensees may use the information in this regulatory guide for actions which do not require NRC review and approval such as changes to a facility design under 10 CFR 50.59. Licensees may use the information in this regulatory guide or applicable parts to resolve regulatory or inspection issues.

Use by NRC Staff

During regulatory discussions on plant specific operational issues, the staff may discuss with licensees, various actions consistent with staff positions in this regulatory guide, as one acceptable means of meeting the underlying NRC regulatory requirement. Such discussions would not ordinarily be considered backfitting even if prior versions of this regulatory guide are part of the licensing basis of the facility. However, unless this regulatory guide is part of the licensing basis for a facility, the staff may not represent to the licensee that the licensee's failure to comply with the positions in this regulatory guide constitutes a violation.

If an existing licensee voluntarily seeks a license amendment or change and (1) the NRC staff's consideration of the request involves a regulatory issue directly relevant to this new or revised regulatory guide and (2) the specific subject matter of this regulatory guide is an essential consideration in the staff's determination of the acceptability of the licensee's request, then the staff may request that the licensee either follow the guidance in this regulatory guide or provide an equivalent alternative process that demonstrates compliance with the underlying NRC regulatory requirements. This is not considered backfitting as defined in 10 CFR 50.109(a)(1) or a violation of any of the issue finality provisions in 10 CFR Part 52.

¹ In this section, "licensees" refers to licensees of nuclear power plants under 10 CFR Parts 50 and 52; and the term "applicants," refers to applicants for licenses and permits for (or relating to) nuclear power plants under 10 CFR Parts 50 and 52, and applicants for standard design approvals and standard design certifications under 10 CFR Part 52.

² In this section, "voluntary" and "voluntarily" means that the licensee is seeking the action of its own accord, without the force of a legally binding requirement or an NRC representation of further licensing or enforcement action.

The NRC staff does not intend or approve any imposition or backfitting of the guidance in this regulatory guide. The NRC staff does not expect any existing licensee to use or commit to using the guidance in this regulatory guide, unless the licensee makes a change to its licensing basis. The NRC staff does not expect or plan to request licensees to voluntarily adopt this regulatory guide to resolve a generic regulatory issue. The NRC staff does not expect or plan to initiate NRC regulatory action which would require the use of this regulatory guide. Examples of such unplanned NRC regulatory actions include issuance of an order requiring the use of the regulatory guide, requests for information under 10 CFR 50.54(f) as to whether a licensee intends to commit to use of this regulatory guide, generic communication, or promulgation of a rule requiring the use of this regulatory guide without further backfit consideration.

Additionally, an existing applicant may be required to adhere to new rules, orders, or guidance if 10 CFR 50.109(a)(3) applies.

Conclusion

This regulatory guide is not being imposed upon current licensees and may be voluntarily used by existing licensees. In addition, this regulatory guide is issued in conformance with all applicable internal NRC policies and procedures governing backfitting. Accordingly, the NRC staff issuance of this regulatory guide is not considered backfitting, as defined in 10 CFR 50.109(a)(1), nor is it deemed to be in conflict with any of the issue finality provisions in 10 CFR Part 52.

If a licensee believes that the NRC is either using this regulatory guide or requesting or requiring the licensee to implement the methods or processes in this regulatory guide in a manner inconsistent with the discussion in this Implementation section, then the licensee may file a backfit appeal with the NRC in accordance with the guidance in NUREG-1409 and NRC Management Directive 8.4.

REFERENCES³

1. 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," U.S. Nuclear Regulatory Commission, Washington, DC.
2. NEI 07-13, "Methodology for Performing Aircraft Impact Assessments for New Plant Designs," Revision 8, Nuclear Energy Institute, Washington, DC, April 2011, ADAMS Accession No. ML111440006.⁴
3. 74 FR 28111, "Consideration of Aircraft Impacts for New Nuclear Power Reactors; Final Rule," *Federal Register*, Volume 74, Number 112, pp. 28111 and 28143, Washington, DC, June 12, 2009.
4. 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," U.S. Nuclear Regulatory Commission, Washington, DC.

³ Publicly available NRC published documents such as Regulations, Regulatory Guides, NUREGs, and Generic Letters listed herein are available electronically through the NRC Library on the NRC's public Web site at: <http://www.nrc.gov/reading-rm/doc-collections/>. Copies are also available for inspection or copying for a fee from the NRC's Public Document Room (PDR) at 11555 Rockville Pike, Rockville, MD; the mailing address is USNRC PDR, Washington, DC 20555; telephone 301-415-4737 or (800) 397-4209; fax (301) 415-3548; and e-mail PDR.Resource@nrc.gov.

⁴ Copies of the non-NRC documents included in these references may be obtained directly from the publishing organization.