

**NUCLEAR REGULATORY COMMISSION**

**10 CFR Parts 50 and 52**

**RIN 3150-AI19**

**[NRC-2007-0009]**

**Consideration of Aircraft Impacts for New Nuclear Power Reactors**

**AGENCY:** U.S. Nuclear Regulatory Commission.

**ACTION:** Final rule.

**SUMMARY:** The U.S. Nuclear Regulatory Commission (NRC or the Commission) is amending 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. The applicant is required to use realistic analyses to identify and incorporate design features and functional capabilities to show, with reduced use of operator actions, that either the reactor core remains cooled or the containment remains intact, and either spent fuel cooling or spent fuel pool integrity is maintained. These requirements apply to applicants for new construction permits; new operating licenses that reference a new construction permit; new standard design certifications; renewal of any of the four existing design certifications if the design has not previously been amended to comply with the rule; new standard design approvals; manufacturing licenses that don't reference a standard design certification or standard design approval, or that reference a standard design certification issued before the effective date of the rule which has not been amended to comply with the rule; and combined licenses that don't reference a standard design certification, standard design approval, or manufactured reactor, or that reference a standard design certification issued before the effective date of the rule which has not been amended to comply with the rule. In addition, these amendments contain requirements for control of

changes to any design features or functional capabilities credited to show that the facility can withstand the effects of an aircraft impact.

**ADDRESSES:** You can access publicly available documents related to this document using the following methods:

**Federal e-Rulemaking Portal:** Go to <http://www.regulations.gov> and search for documents filed under Docket ID [NRC-2007-0009]. Address questions about NRC dockets to Ms. Carol Gallagher 301-492-3668; e-mail [Carol.Gallagher@nrc.gov](mailto:Carol.Gallagher@nrc.gov).

**NRC's Public Document Room (PDR):** The public may examine and have copied for a fee publicly available documents at the NRC's PDR, Public File Area O1 F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland.

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**DATES:** The effective date is **[INSERT DATE 30 DAYS AFTER THE DATE OF PUBLICATION]**.

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## I. Introduction

The Commission 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 Commission has determined that the impact of a large, commercial aircraft is a beyond-design-basis event, and the NRC's 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 this final rule (aircraft impact rule). The NRC's approach to aircraft impacts is consistent with its previous approach to beyond-design-basis events. The objective of this rule is to require nuclear power plant<sup>1</sup> designers to perform a rigorous assessment of the design to identify design features and functional capabilities that could provide additional inherent protection to withstand the effects of an aircraft impact (i.e., meet the rule's acceptance criteria). This rule should result in new nuclear power reactor facilities being more inherently robust with regard to an aircraft impact than if they were designed in the absence of this final rule. This final rule provides an enhanced level of protection beyond that which is provided by the existing adequate protection requirements, which all operating power reactors are required to meet.

The final rule requirement to perform a design-specific assessment to identify design features and functional capabilities applies to applicants for new construction permits; new

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<sup>1</sup> The requirements of the final aircraft impact rule may apply, in some contexts, to the designer who is responsible for, or seeks certification or regulatory approval of something less than a complete nuclear power plant (e.g., a nuclear reactor without site-specific elements such as the ultimate heat sink). For ease of discussion in the remainder of this Supplementary Information, reference to a "nuclear power plant designer" or "facility designer" is meant to include, in the appropriate context, a designer of something less than a complete nuclear power plant, but is at least as encompassing as a "nuclear reactor." Similarly, a reference to the design of a "facility" also encompasses, in the appropriate context, the design of something less than a complete nuclear power plant (e.g., the design of a reactor).

operating licenses that reference a new construction permit; new standard design certifications; renewal of any of the four existing design certifications if the design has not previously been amended to comply with the final rule; new standard design approvals; manufacturing licenses that don't reference a standard design certification or standard design approval, or that reference a standard design certification issued before the effective date of the rule which has not been amended to comply with the rule; and combined licenses that don't reference a standard design certification, standard design approval, or manufactured reactor, or that reference a standard design certification 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" throughout the remainder of the Supplementary Information for this final rule. These applicants are required to perform an assessment of 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 the containment remains intact and spent fuel cooling or spent fuel pool integrity is maintained (herein after referred to as the acceptance criteria). Applicants are required to describe how such design features and functional capabilities meet the acceptance criteria of the rule. Applicants and licensees are subject to requirements for the control of changes to the design features and functional capabilities identified as a result of complying with this final rule.

The Commission-approved design basis threat (DBT) does not include an aircraft attack. The NRC published its final DBT rule in the *Federal Register* on March 19, 2007 (72 FR 12705) (Title 10, § 73.1, "Purpose and scope," of the *Code of Federal Regulations* (10 CFR 73.1)). Two well-established bases support the exclusion of aircraft attacks from the DBT. First, it is not reasonable to expect a licensee with a private security force using weapons legally available to it to be able to defend against such an attack. Second, such an act is in the nature of an attack by

an enemy of the United States (U.S.). Power reactor licensees are not required to design their facilities or otherwise provide measures to defend against such an attack, as provided by 10 CFR 50.13, "Attacks and destructive acts by enemies of the United States; and defense activities."

The Commission has addressed aircraft attacks by regulatory means other than the DBT rule in 10 CFR 73.1. By order dated February 25, 2002 (Interim Compensatory Measures (ICM) Order), the Commission required all operating power reactor licensees to develop and adopt mitigative strategies to cope with large fires and explosions from any cause, including beyond-design-basis aircraft impacts (67 FR 9792; March 4, 2002). The Commission first proposed incorporating the continuing requirement to provide for such mitigative measures in the NRC's regulations in the proposed 10 CFR part 73 power reactor security requirements (71 FR 62663; October 26, 2006), specifically, the proposed Appendix C to 10 CFR part 73, "Licensee Safeguards Contingency Plans." During development of the power reactor security final rule, the NRC determined that several significant changes to the proposed rule language would be needed to adequately address stakeholder comments and associated implementation concerns. To address these comments and concerns, the NRC proposed to relocate the provisions from 10 CFR part 73 to a new paragraph (hh) in 10 CFR 50.54, "Conditions of licenses," in a supplement to the power reactor security requirements proposed rule (73 FR 19443; April 10, 2008). On March 27, 2009 (74 FR 13925), the Commission published a final rule amending existing security regulations and adding new security requirements pertaining to current and future nuclear power reactors that included the new provisions in 10 CFR 50.54(hh). All current and future power reactors are required to comply with the requirements in 10 CFR 50.54(hh), which were promulgated on the basis of adequate protection of public health and safety and common defense and security.

The current requirements, in conjunction with the revisions to 10 CFR 50.54 to address loss of large areas of the plant due to explosions or fires, will continue to provide adequate protection of the public health and safety and the common defense and security. Nevertheless, the Commission has decided to also require applicants for new nuclear power reactors to incorporate into their design additional features to show that the facility can withstand the effects of an aircraft impact. This final rule to address the capability of new nuclear power reactors relative to an aircraft impact is based both on enhanced public health and safety and enhanced common defense and security, but is not necessary for adequate protection. Rather, this rule's goal is to enhance the facility's inherent robustness at the design stage.

Requiring applicants for new nuclear power reactors to perform a rigorous aircraft impact assessment and identify and incorporate into their design those design features and functional capabilities that address the effects of a beyond-design-basis aircraft impact is consistent with the NRC's historic approach to beyond-design-basis events and with the NRC's position in its "Policy Statement on Severe Reactor Accidents Regarding Future Designs and Existing Plants" (50 FR 32138; August 8, 1985). The policy statement notes, "The Commission expects that vendors engaged in designing new standard [or custom] plants will achieve a higher standard of severe accident safety performance than their prior designs." The NRC reiterated that regulatory approach in its "Policy Statement on the Regulation of Advanced Nuclear Power Plants" (59 FR 35461; July 12, 1994), when it stated, "The Commission expects that advanced reactors would provide enhanced margins of safety and/or utilize simplified, inherent, passive, or other innovative means to accomplish their safety functions." These concepts continue to be NRC policy as reflected in the NRC's 2008 "Policy Statement on the Regulation of Advanced Reactors" (73 FR 60612; October 14, 2008). This regulatory approach has demonstrated its success, as all designs subsequently submitted to and certified by the Commission represent substantial improvement in safety for operational events and accidents. The final aircraft impact

rule will further enhance the safety of new nuclear power plants for aircraft impacts and is consistent with these policy statements.

The Commission considered the appropriate location for requirements on an aircraft impact assessment during its deliberations on the security assessment rulemaking (draft 10 CFR 73.62) proposed by the NRC staff in SECY-06-0204, "Proposed Rulemaking—Security Assessment Requirements for New Nuclear Power Reactor Designs (RIN 3150-AH92)," dated September 26, 2006. In its Staff Requirements Memorandum (SRM) on SECY-06-0204, dated April 24, 2007, the Commission disapproved the staff's recommended rulemaking as described in SECY-06-0204. The Commission directed the NRC staff to include the aircraft impact assessment requirements in 10 CFR part 52, "Licenses, Approvals, and Certifications for Nuclear Power Plants," to encourage reactor designers to incorporate practical measures at an early stage in the design process.

As a result of the Commission's SRM, the NRC published a proposed rule for comment in the *Federal Register* (72 FR 56287; October 3, 2007). The proposed rule would have required applicants to assess the effects of the impact of a large, commercial aircraft on the nuclear power facility. Based on the insights gained from the assessment, the applicant would have been required to include in its application a description and evaluation of design features, functional capabilities, and strategies to avoid or mitigate, to the extent practicable, the effects of the aircraft impact with reduced reliance on operator actions. The public comment period for the proposed rule closed on December 17, 2007. A public meeting was held during the public comment period to discuss the proposed rule and to address any questions on the proposed rule. The NRC received 32 comment letters from industry representatives, public interest groups, and concerned citizens on the proposed rule.

This final rule revises 10 CFR parts 50, "Domestic Licensing of Production and Utilization Facilities," and 52 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. The applicant is required to identify and incorporate into the design those design features and functional capabilities to show that the facility can withstand the effects of an aircraft impact with reduced use of operator actions. This aircraft impact rule, along with provisions in the NRC's power reactor security rule, including the addition of the provisions in 10 CFR 50.54(hh), and voluntarily-submitted safeguards assessments, render as duplicative and, therefore, unnecessary the draft proposed rule (10 CFR 73.62) to require security assessments. The draft proposed security assessment rule would have required a security assessment which would include mitigation of large fires and explosions, a target set analysis, and design features to protect target sets against DBTs. The provisions of that draft proposed rule applicable to large fires and explosions from an aircraft impact are subsumed by this final aircraft impact rule and by the addition of the provisions in 10 CFR 50.54(hh). Sufficient target set provisions are included in the NRC's changes to 10 CFR 73.55, "Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage," which applicants for new facilities will have to satisfy. Designers of new nuclear power reactors are encouraged to account for the provisions for mitigation of large fires and explosions in the facility design so as to minimize more costly, post-design features to meet those requirements. Design certification and combined license applicants are voluntarily submitting security assessments that identify design features to protect target sets against DBTs. Accordingly, the draft proposed 10 CFR 73.62 is not necessary.

This new aircraft impact assessment rule complements the revisions to 10 CFR 50.54(hh) to mitigate the effects of large fires and explosions. The 10 CFR 50.54(hh) provisions on mitigating large fires and explosions codify the adequate protection requirement imposed on existing operating reactors by ICM Order, Item B.5.b. The 10 CFR 50.54(hh) provisions, therefore, are necessary for adequate protection and must remain in regulations that

are applicable to all currently operating reactors and must be satisfied by all newly licensed power reactors. Current reactor licensees have already developed and implemented procedures to comply with the 10 CFR 50.54(hh) requirements, and would not require any additional action to comply with those rule provisions. New applicants for and new holders of operating licenses under 10 CFR part 50 and combined licenses under 10 CFR part 52 will be required to develop and implement procedures that will employ mitigating strategies similar to those now employed by current licensees to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities under the circumstances associated with loss of large areas of the plant due to explosions or fire. The requirements in 10 CFR 50.54(hh) relate to the development of procedures for addressing certain events that are the cause of large fires and explosions that affect a substantial portion of the nuclear power plant, and are not limited or directly linked to an aircraft impact. The rule contemplates that the initiating event for such large fires and explosions could be any number of DBT or beyond-DBT events. In addition, the NRC regards 10 CFR 50.54(hh) as necessary for reasonable assurance of adequate protection to public health and safety and common defense and security. This is consistent with the NRC's designation of the orders on which 10 CFR 50.54(hh) is based as being necessary for reasonable assurance of adequate protection.

In contrast to the adequate protection requirements of 10 CFR 50.54(hh), this aircraft impact final rule will enhance safety and security by requiring an assessment of newly designed facilities to show that the facility can withstand the effects of an aircraft impact. New nuclear power reactor applicants will be subject to both the requirements of the aircraft impact rule and the requirements in 10 CFR 50.54(hh). The overall objective of these rules is to enhance a nuclear power plant's capabilities to withstand the effects of a large fire or explosion, whether caused by an aircraft impact or other event, from the standpoints of both design and operation. The impact of a large aircraft on the nuclear power plant is regarded as a beyond-design-basis

event. In light of the NRC's view that effective mitigation of the effects of events causing large fires and explosions (including the impact of a large, commercial aircraft) can be provided through operational actions, the NRC believes that the mitigation of the effects of aircraft impacts through design should be regarded as a safety enhancement which is not necessary for adequate protection. Therefore, the aircraft impact rule—unlike 10 CFR 50.54(hh)—is regarded as a safety enhancement, which is not necessary for adequate protection.

The NRC regards the aircraft impact and 10 CFR 50.54(hh) rulemakings to be complementary in scope and objective. The aircraft impact rule focuses on enhancing the design of future nuclear power plants to withstand large, commercial aircraft impacts, with reduced use of operator actions. The provisions of 10 CFR 50.54(hh) focus on ensuring that the nuclear power plant's licensees will be able to implement effective mitigation measures for large fires and explosions, including (but not explicitly limited to) those caused by the impact of a large, commercial aircraft.

Consideration of a rule to require applicants for new nuclear power reactors to perform an aircraft impact assessment and describe design features and functional capabilities addressing such impacts, which are beyond-design-basis scenarios, is similar to the Commission's consideration in the mid-1980's of new rules addressing accidents more severe than design basis accidents. The 1985 "Policy Statement on Severe Reactor Accidents" explained the Commission's conclusion that, although it was proposing criteria to show new reactor designs to be acceptable for severe accident concerns, then-existing plants posed no undue risk to public health and safety, and thus, there was no need for action on operating reactors based on severe accident risks. The Commission's reasoning in the severe accident context supports its conclusion that although new nuclear power reactors should be assessed for aircraft impacts and designed to show that they can withstand the effects of an aircraft

impact, existing reactors and designs provide adequate protection of the public health and safety and common defense and security.

The NRC is making several changes from the proposed rule requirements in this final rule. First, based on consideration of public comments, the NRC is revising the criteria necessary to comply with the final rule. The proposed rule would have required applicants for new nuclear power reactors to perform a design-specific assessment of the effects of the impact of a large, commercial aircraft. Based upon the insights gained from the aircraft impact assessment, the applicant would have been required to include a description and evaluation of the design features, functional capabilities, and strategies to avoid or mitigate the effects of the applicable, beyond-design-basis aircraft impact and describe how such design features, functional capabilities, and strategies avoid or mitigate, to the extent practicable, the effects of the applicable aircraft impact with reduced reliance on operator actions. The evaluation of such design features, functional capabilities, and strategies would have been required to include core cooling capability, containment integrity, and spent fuel pool integrity. In the final rule, applicants continue to be required to perform a design-specific assessment of the effects of the impact of a large, commercial aircraft. In addition, the applicant is required to use realistic analyses to identify and incorporate into the design those design features and functional capabilities which show, with reduced use of operator action, that the reactor core remains cooled or the containment remains intact and spent fuel cooling or spent fuel pool integrity is maintained. The final rule removes references to considering the practicality of including the design features and functional capabilities identified as a result of the assessment. The acceptance criteria in the rule must be shown to be met to achieve compliance with the rule's requirements.

The Commission ultimately decided that the final rule should require applicants to show that, in the event of an aircraft impact at a nuclear power plant, the reactor core would remain cooled or the containment structure would remain intact and spent fuel cooling or spent fuel pool

integrity would be maintained. With implementation of this final rule, applicants for new nuclear power reactors can use realistic analyses to assess their designs but cannot rely solely on operator actions to meet the acceptance criteria. The Commission continues to believe that subsequent generations of plants to be built in the U.S. will be inherently more capable of resisting beyond design basis events, including aircraft impacts, due to safety improvements previously incorporated into these designs. The addition of this rule, revised to include specific acceptance criteria, will provide additional assurance that all reasonable design measures were taken to add additional margin beyond the adequate protection standard that is being met through compliance with 10 CFR 50.54(hh). The addition of specific acceptance criteria to this rule adds regulatory stability and predictability that is not achievable with criteria that must only be met “to the extent practical.” Acceptance criteria that are based on functional requirements provide a benchmark that can be assessed for the purpose of determining compliance with this rule, yet provide the distinction necessary to keep enhancements implemented for a beyond-design-basis event separate from design requirements necessary to meet 10 CFR part 100, “Reactor site criteria.”

The NRC is also expanding the class of applicants that are required to comply with this rule based on consideration of public comments and implementation issues. In one change, the NRC is applying the final rule to 10 CFR part 50 license applicants as well as applicants under 10 CFR part 52. The final rule requires both new power reactor construction permit applicants and operating license applicants to perform the required assessment and include the description of the identified design features and functional capabilities in their applications. The NRC is applying the final rule to applicants at both the construction permit and operating license stages because it is not until the operating license stage that the applicant is required to provide the NRC with its final design. The NRC can issue a construction permit based on preliminary design information. Therefore, the NRC believes it is necessary to require applicants to perform the

aircraft impact assessment at both stages and to include the required information in both applications based on the level of design information available at the time of each application. These changes are reflected in the addition of new paragraphs (a)(13) and (b)(12) in 10 CFR 50.34, "Contents of construction permit and operating license applications; technical information," requiring all applicants for a construction permit or operating license which are subject to 10 CFR 50.150(a) (proposed 10 CFR 52.500) to submit the information required by 10 CFR 50.150(b) as a part of their application. Paragraph (a) of 10 CFR 50.150 has similarly been revised.

In making these additions, the NRC is making it clear that the requirements are not meant to apply to current or future operating license applications for which construction permits were issued before the effective date of this final rule. This is because existing construction permits are likely to involve designs which are essentially complete and may involve sites where construction has already taken place. Applying the final rule to operating license applications for which there are existing construction permits could result in an unwarranted financial burden to change a design for a plant that is partially constructed. Such a financial burden is not justifiable in light of the fact that the NRC considers the events to which the aircraft impact rule is directed to be beyond-design-basis events and compliance with the rule is not needed for adequate protection to public health and safety or common defense and security. Moreover, such operating license applicants will be required to comply with the requirements in 10 CFR 50.54(hh) to identify actions to mitigate the effects of large fires and explosions, including those caused by aircraft impacts. For these reasons, the NRC is not requiring operating license applicants with an existing construction permit to comply with the final rule.

The NRC is also adding requirements in 10 CFR 50.150(c) (proposed 10 CFR 52.502) for controlling changes to the information required by 10 CFR 50.150(b) to be included in the preliminary safety analysis report (PSAR) by a construction permit applicant and the final safety

analysis report (FSAR) by an operating license applicant. The NRC is applying the same change control requirements to construction permit and operating license holders as it is applying to combined license holders. If the permit holder or licensee changes the information required by 10 CFR 50.34 to be included in the PSAR or FSAR, then the permit holder or licensee must consider the effect of the changed feature or capability on the original assessment required by 10 CFR 50.150(a) and amend the information required by 10 CFR 50.34 to be included in the PSAR or FSAR to describe how the modified design features and functional capabilities continue to meet the assessment requirements in 10 CFR 50.150(a)(1).

Because the final rule is applicable to applicants under both 10 CFR parts 50 and 52, the NRC is relocating the aircraft impact assessment requirements that were contained in proposed 10 CFR 52.500 to a new section, 10 CFR 50.150. This change is also consistent with the recent revision to 10 CFR part 52, where the NRC took a comprehensive approach to reorganizing 10 CFR part 52 and making conforming changes throughout 10 CFR Chapter I, "Nuclear Regulatory Commission," to reflect the licensing and approval processes in 10 CFR part 52. In making conforming changes involving 10 CFR part 50 provisions in that rulemaking, the NRC adopted the general principle of keeping technical requirements in 10 CFR part 50 and maintaining applicable procedural requirements in 10 CFR part 52. For these reasons, the NRC is relocating the proposed aircraft impact requirements from proposed 10 CFR 52.500 to 10 CFR 50.150.

Based on public comments, the NRC is making the requirements in 10 CFR 50.150 applicable to the four existing design certifications in 10 CFR part 52, appendices A through D, at their first renewal if the design has not previously been amended to comply with the final rule. This change is discussed in detail in Section IV, "Renewal of an Operating License, Standard Design Certification, Combined License, or Manufacturing License," of this document.

The NRC is also making several changes to the terminology that was used in the proposed rule. In the proposed rule, 10 CFR 52.500 stated that applicants for new nuclear power reactors were required to perform a design-specific assessment of the effects on the designed facility of the impact of a large, commercial aircraft. Based on the insights gained from that assessment, applicants would have been required to include a description and “evaluation” of the design features, functional capabilities, and strategies to avoid or mitigate the effects of the applicable aircraft impact. Reference to such an “evaluation” was made throughout the Supplementary Information in the proposed rule. However, the NRC determined that the term “evaluation” was used in more than one context and concluded that such inconsistent use could cause confusion. In the final rule, the NRC has eliminated the use of the term “evaluation” in the rule language. The new requirements governing what covered applicants are required to submit in their applications (10 CFR 50.150(b)) states that applicants must submit a description of the design features and functional capabilities identified in the assessment and a description of how the identified design features and functional capabilities meet the assessment requirements.

Another area where the NRC is changing the terminology used in the final aircraft impact rule is the elimination of the term, “strategies.” The proposed aircraft impact rule required the assessment to include a description of the design features, functional capabilities, and strategies to avoid or mitigate the effects of the applicable, beyond-design-basis aircraft impact (proposed 10 CFR 52.500(c)). Neither the proposed rule nor its Supplementary Information defined “strategies.” Upon consideration, the NRC has decided to eliminate that term in the final rule. A “strategy” is typically associated with human action and may, therefore, appear to conflict with the direction in 10 CFR 50.150(a)(1) of the final aircraft impact rule that there should be “reduced use of operator actions.” In addition, the aircraft impact rule is focused only on design, and was not intended to address or impose requirements on the operation of a facility. By using the term, “strategies” in the proposed aircraft impact rule, there is a real possibility that stakeholders may

erroneously interpret the aircraft impact rule as requiring a designer to address as part of the aircraft impact rule the requirements in 10 CFR 50.54(hh) to mitigate the effects of large fires and explosions. This would be an unnecessary duplication of effort, and would require consideration of procedural and operational matters at an early stage, which is not the NRC's intent and may not be the optimal time for consideration of operational matters. For these reasons, the NRC is dropping its use of the term "strategies" in the final rule. Thus, under 10 CFR 50.150(b), the relevant applicants need only include in their applications a description of the relevant identified design features and functional capabilities, and need not address strategies. The elimination of the term "strategies," does not, however, relieve applicants from the responsibility to consider reducing use of operator actions in performance of the aircraft impact assessment and identification of design features and functional capabilities to comply with this final rule.

In addition, the NRC's decision to remove the need for the designer to identify design "strategies" does not obviate the need for the designer to determine, when considering potential design features and functional capabilities, whether there are responsive actions and strategies (e.g., firefighting) that the nuclear power plant licensee could take to mitigate the effects of the impact of a large, commercial aircraft that would be made possible, or whose effectiveness could be enhanced, by inclusion of such features and capabilities in the design. One objective of the final aircraft impact rule is that the designer identifies and includes in the design those features and capabilities to support the eventual development of effective response and mitigation actions and strategies at the facility licensing stage which make possible or enhance the capability of the plant licensee to respond to aircraft impacts. The NRC believes that it is reasonable for the designer to include appropriate design features and functional capabilities to support practical responsive actions and strategies that the plant licensee could implement. The plant licensee should not be precluded from using an effective responsive action and strategy,

simply because the designer failed to include a well-placed design feature that is necessary for an effective responsive action (e.g., a wall, a water outlet, a control panel).

Finally, the Commission is adding a requirement in the final rule that any changes to the detailed aircraft impact parameters set forth in guidance shall be approved by the Commission.

## **II. Currently Operating Power Reactors**

The Commission has determined that the existing designs of currently operating nuclear power plants, together with the security program actions mandated by the NRC's orders (some of which are codified in the NRC's final DBT rulemaking and others of which are incorporated into other NRC regulations) provide an adequate level of protection to public health and safety and common defense and security against aircraft impacts. As a result of the events of September 11, 2001, the NRC has undertaken a series of actions to provide continued reasonable assurance of adequate protection to public health and safety and common defense and security at the U.S. commercial nuclear power facilities. The NRC has assessed the potential vulnerabilities of operating nuclear power reactors to aircraft impacts, and it has issued orders and provided associated guidance to licensees for implementing a range of mitigative strategies. The results of these aircraft impact assessments were derived from evaluation of plant damage mechanisms (e.g., structural failures, shock and vibration effects, and fire effects). The NRC ensured that implementation of the February 25, 2002, ICM Order included measures to mitigate such scenarios.

The Commission's ICM Order, Item B.5.b, established the requirement for licensees to implement certain mitigation measures at existing power reactors for these beyond-design-basis events. This requirement was specifically intended to address "losses of large areas of a (reactor) plant due to fires and explosions." The Commission has since incorporated this requirement into 10 CFR 50.54 in the power reactor security rulemaking. Under the provisions

of 10 CFR 50.54, future license applicants must identify and implement mitigative measures similar to those required for currently operating nuclear power plants.

On March 19, 2007 (72 FR 12705), the Commission published a final rule amending the DBT in 10 CFR 73.1. The DBT rule describes general attributes that nuclear power plant licensees must defend against with high assurance. This rulemaking enhanced the DBT by codifying generically applicable security requirements similar to those previously imposed by the Commission's April 29, 2003, DBT Orders.

On the basis of the previous information, the NRC concludes that existing power reactors pose no undue risk to public health and safety or common defense and security from the effects of an aircraft impact based on the Commission's specified aircraft impact characteristics. Therefore, the NRC is not applying this final rule to existing operating nuclear power plants.

### **III. Currently Approved Standard Design Certifications and Combined Licenses Referencing These Certifications**

Based upon consideration of public comments, the NRC has decided that the designs of all newly designed and constructed nuclear power plants (i.e., those designed and constructed after **[INSERT EFFECTIVE DATE OF FINAL RULE]**) must comply with the aircraft impact rule. The NRC agreed with the majority of commenters who stated that the underlying objectives of the aircraft impact rule would not be fully achieved if a subset of new nuclear power plant applicants—namely, those applicants who reference one of the four existing design certifications—is not required to comply with the aircraft impact rule. This decision stems from acknowledgement of the views expressed by a wide range of stakeholders in favor of requiring all new nuclear power plants to meet the requirements of the aircraft impact rule. Thus, the NRC is requiring that all new nuclear power plants in the U.S. be required to use designs that comply with the aircraft impact rule.

In evaluating this change, the NRC considered regulatory approaches that could be used if a combined license application references one of the four currently approved standard design certifications in Appendices A through D of 10 CFR part 52 which has not been voluntarily amended to comply with the aircraft impact rule. The NRC considered whether the combined license applicant should be required to perform the assessment of aircraft impacts itself and use the design features and functional capabilities identified as the result of its assessment in the design of their plant, but with no obligation to modify the referenced design certification. A second approach considered by the NRC would require that the four currently approved design certifications be amended by the original design certification applicant to comply with the aircraft impact rule within a short time after issuance of the final aircraft impact rule. The NRC also considered a third approach, whereby the NRC would require that the four currently approved design certifications be amended to comply with the aircraft impact rule (without specifying who is responsible for prosecuting the amendment), but only if they are referenced in a combined license application. This approach would also restrict the NRC from issuing a combined license referencing one of the four currently approved design certifications, unless it had been amended to comply with the aircraft impact rule (again, without specifying who is responsible for prosecuting the amendment). The NRC has determined that the first approach should be adopted in the aircraft impact rule (i.e., the combined license applicant be required to perform the assessment of aircraft impacts and incorporate design features and functional capabilities into the design of the applicant's facility with no concurrent obligation to modify the referenced design certification). The NRC believes that this approach will ensure that a nuclear power plant which is constructed using one of the currently approved design certifications will nonetheless meet the aircraft impact rule without unnecessary delays associated with amending the referenced design certification rule. The NRC recognizes that the first approach may result in less standardization of design features and functional capabilities addressing aircraft impact for

nuclear power plants referencing one of the four currently approved design certifications. However, the NRC believes that, as a practical matter, given the likely small number of combined license applications referencing one of the four currently approved design certifications which has not been amended to comply with the rule, any reduction in standardization is likely to be minimal.

However, the NRC has also decided that if any of the four currently approved design certifications are not amended to comply with the aircraft impact rule by the end of the initial period of effectiveness and an applicant seeks to renew the design certification, then the certified design must be amended to comply with the aircraft impact rule before the renewal is approved by the NRC under the provisions of 10 CFR 52.57 through 10 CFR 52.61. The NRC's determination in this regard is discussed in Section IV, "Renewal of an Operating License, Standard Design Certification, Combined License, or Manufacturing License," of this document. The NRC has concluded that it should use the same criteria for evaluating voluntary requests for amendments to existing design certifications as it uses for evaluating new applications for design certifications, to ensure consistency among all new reactor designs.

#### **IV. Renewal of an Operating License, Standard Design Certification, Combined License, or Manufacturing License**

This rulemaking does not require updating the assessment of aircraft impacts required by 10 CFR 50.150 as part of an application for either a renewed operating license under 10 CFR part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," a renewed design certification under 10 CFR 52.57, "Application for renewal," a renewed combined license under 10 CFR 52.107, "Application for renewal," and 10 CFR part 54, or a renewed manufacturing license under 10 CFR 52.177, "Application for renewal." The NRC's requirement for assessment of large, commercial aircraft impacts is not an aging-related matter, nor is it based on time-limited considerations. Hence, aircraft impacts under the final rule are

outside the scope of any operating license or combined license renewal proceeding under 10 CFR part 54, and neither operating nor combined license holders need to update the assessment required by 10 CFR 50.150(b) at the license renewal stage.

With regard to design certifications and manufacturing licenses which comply with the aircraft impact rule upon initial issuance or upon amendment, the NRC believes that their renewal review should not include a reassessment of aircraft impacts and possible changes to the design to include new design features and functional capabilities. In the NRC's view, there will not be any significant benefit to requiring applicants for renewal to reassess the design's vulnerability to aircraft impacts absent a Commission-approved change in the detailed parameters on aircraft impact characteristics set forth in guidance for use in the aircraft impact assessment. As discussed later in Section V.B, "Description of Beyond-Design-Basis Aircraft Impact," of the Supplementary Information for this final rule, the final rule requires that the design-specific impact assessment use the Commission-specified aircraft impact characteristics as described in 10 CFR 50.150(a)(2) and changes to the detailed parameters on aircraft impact characteristics set forth in guidance shall be approved by the Commission. Because this final rule is intended to provide added protection against the effects of a beyond-design-basis event, the choice of aircraft impact characteristics and the scenario used for this assessment will not be linked to threat assessments or to any evolution of aircraft design. Therefore, there is no need to require a reassessment at the design certification or manufacturing license renewal stage. In addition, mandating a change to the design at the renewal stage would pose an undue burden on those licensees who have referenced the design certification in their license, or used the manufactured reactor at their facility. Under 10 CFR 52.63(a)(3) and 10 CFR 52.171(a)(2), the NRC requires that any modification it imposes on a design certification rule or on the design of a manufactured reactor be applied to all plants referencing the certified design or reactor manufactured under the manufacturing license, except those to which the modification has been

rendered technically irrelevant. If the NRC were to require reassessment of the design at renewal, this could cause licensees who have already designed and constructed their plants (or used a manufactured reactor) to modify their plants to come into conformance with the reassessed design. Such modifications are likely to be costly. Given the NRC's determination that the impact of a large, commercial aircraft is a beyond-design-basis event, the imposition of such costs as the result of reassessment at design certification or manufacturing license renewal does not seem warranted. Moreover, once the design features and functional capabilities for addressing an aircraft impact have been incorporated into a nuclear power plant's design, the goal of this final rule has been achieved in that consideration of aircraft impacts has been factored into the design. In any event, 10 CFR 52.59, which establishes limited finality control over the NRC's renewal of design certifications, does permit the NRC to impose modifications to the design at design certification renewal under certain circumstances (see 10 CFR 52.59(b)(1) through (3)). Accordingly, given that future design certifications and manufacturing licenses must, under the final aircraft impact rule, meet the requirements of the rule upon initial issuance, the NRC has decided that these design certifications and manufacturing licenses need not be required by rule to update the aircraft impact assessment at the time of renewal.

However, upon consideration of these factors in relation to the renewal of the four currently approved design certifications, the NRC has come to the conclusion that if any of these four design certifications have not been updated in the first 15-year duration of effectiveness, then the design must be amended to comply with the aircraft impact rule at the time of renewal under 10 CFR 52.57 through 52.61. In this situation, the NRC believes that regulatory consistency, predictability, and efficiency all favor requiring any of the four current design certifications which have not been amended to meet the aircraft impact rule at the time of renewal of the design certification to comply with the aircraft impact rule as part of the renewal process.

The NRC's determination is reflected in the final rule as an amendment to 10 CFR 52.59(a). As revised, paragraph (a) requires the NRC to find, at the first renewal of any of the four currently approved design certifications, that the renewed design (i.e., the design which is being approved for use in the renewed term of the design certification rule) complies with the requirements of the aircraft impact rule.

The NRC has determined, consistent with the intent of 10 CFR 52.59(b), that requiring the renewed design to comply with the aircraft impact rule constitutes a substantial increase in protection to public health and safety. The reasons supporting this determination are set forth in Section XVI, "Backfit Analysis," of the Supplementary Information for this final rule. The NRC wishes to emphasize that imposing this requirement on the renewal of the four currently approved design certifications does not represent any substantial decrease in the commercial interests of the original applicants for these design certifications (or their successors in interests). Accordingly, the NRC concludes that the four currently approved design certifications, if they have not already been amended to comply with the aircraft rule, must comply with the rule the first time any of those design certifications are renewed.

The NRC notes that one of the consequences of the NRC's determination that each of the four currently approved design certifications must comply with the aircraft impact rule if renewed, is that there may be increased public confidence in the safety of the renewed designs. The NRC's view is based upon public comments from several stakeholders urging that the four design certifications be required to comply with the aircraft impact rule.

## V. New Nuclear Power Reactors

### A. Introduction.

Under this final rule, relevant applicants for new nuclear power reactors are required to:

- Perform an assessment of the effects on the designed facility of a beyond-design-basis aircraft impact.
- Using realistic analyses, identify and incorporate into the design those design features and functional capabilities to show, with reduced use of operator action, that the facility can withstand the effects of an aircraft impact (i.e., that the rule's acceptance criteria are met).
- Describe how such design features and functional capabilities show, with reduced use of operator action, that the facility can withstand the effects of an aircraft impact.

This final rule is based on the premise that it is desirable for newly-constructed power reactors to be designed to withstand the effects of an aircraft impact through design features or functional capabilities that reduce or eliminate the need for operator actions. Because this type of consideration is more effectively done during the development of the design itself, the NRC directs the requirements of this final rule at plant designers.

The NRC does not expect plant designers to demonstrate that design features alone, without operator action or mitigative response activity as required under 10 CFR 50.54(hh), will completely address the effects of the aircraft impact. The NRC recognizes that the decision to rely on design features (as opposed to operator action or mitigative strategies required under 10 CFR 50.54(hh)) is complex, and often involves a set of trade-offs between competing considerations. The NRC's goal is to have the designer implement a rigorous assessment process to ensure that the design process constitutes a reasoned approach for assessing the

plant design to identify design features and functional capabilities to show that the facility can withstand the effects of an aircraft impact.

#### **B. Description of Beyond-Design-Basis Aircraft Impact.**

Since September 11, 2001, the Commission has used state-of-the art technology to assess the effects of aircraft impacts on nuclear power plants. As part of a comprehensive review of security for NRC-licensed facilities, the NRC conducted detailed, site-specific engineering studies of a limited number of nuclear power plants to assess potential vulnerabilities of deliberate attacks involving large, commercial aircraft. In conducting these studies, the NRC consulted national experts from several Department of Energy laboratories using state-of-the-art structural and fire analyses. The agency also used realistic predictions of accident progression and radiological consequences.

This final rule presents a general description of the aircraft impact characteristics that are required to be used to perform the beyond-design-basis aircraft impact assessment. The assessment must be based on the beyond-design-basis impact of a large, commercial aircraft used for long distance flights in the U.S., with aviation fuel loading typically used in such flights, and an impact speed and angle of impact considering the ability of both experienced and inexperienced pilots to control large, commercial aircraft at the low altitude representative of a nuclear power plant's low profile.

Beyond these general characteristics, the NRC will specify for plant designers in a safeguards information (SGI) guidance document more detailed parameters describing the large, commercial aircraft impact that are considered appropriate for use in the required assessment. Although the detailed aircraft impact assessment parameters will be described in an SGI guidance document and will not be publicly available because of their potential value to terrorists, the following description of some of the factors used in selecting the parameters is offered to foster a better understanding of this final rulemaking. Changes to these detailed

parameters on aircraft impact characteristics set forth in this guidance shall be approved by the Commission.

1. *The aircraft used by the terrorists on September 11, 2001.* The NRC staff has reviewed the results of the September 11, 2001, attacks on the World Trade Center and the Pentagon. The NRC has used these reviews in previous studies for operating reactors. The NRC also used these reviews to make its decisions with respect to this final rulemaking.

2. *Communications with other U.S. Government agencies.* Since September 11, 2001, the NRC has worked closely with the Department of Homeland Security, the Department of Defense, and other agencies, both to understand their information on terrorist threats and to communicate the NRC's study results.

3. *Communications with foreign governments.* A number of foreign governments are considering the construction of new nuclear power plants. The NRC is communicating with the regulatory authorities in these countries to understand their requirements and to convey its own results and plans.

4. *Evaluations of commercial aircraft.* The NRC has studied the types, numbers, and characteristics of commercial aircraft flown in U.S. airspace.

Because this final rule is intended to provide added protection against the effects of a beyond-design-basis event, the choice of aircraft impact characteristics and the scenario used for this assessment will not be linked to threat assessments or to any evolution of aircraft design. The final rule requires that the design-specific impact assessment use the Commission-specified aircraft impact characteristics as described in 10 CFR 50.150(a)(2) (proposed 10 CFR 52.500(b)). As stated previously, more specific details about the aircraft impact characteristics will be contained in a separate guidance document under SGI controls. Because this guidance document containing more detailed aircraft impact assessment parameters will be SGI, the document will only be made available to those individuals with a need-to-know and who

are otherwise qualified to have access to SGI. Plant designers (including their employees and agents) who meet the Commission's requirements for access to SGI will have access to the guidance document containing these more detailed parameters to perform the assessments required by this final rule.

### **C. Aircraft Impact Assessment.**

#### Technical Issues

Because the aircraft impact is a beyond-design-basis event, the methods and acceptance criteria used should be based on realistic assumptions. The aircraft impact assessment is expected to include the items detailed in the following paragraphs:

1. *Consideration of aircraft impact characteristics.* The assessment must consider the impact of a large, commercial aircraft of the type currently in use for long distance flights in the U.S. as described previously in this document and in 10 CFR 50.150(a)(2). More detailed aircraft impact assessment parameters that are considered appropriate for use in this assessment will be contained in a separate guidance document under SGI controls.

2. *Plant functions, structures, systems, components, and locations to be assessed.* The critical functions required to be evaluated in the aircraft impact assessment include core cooling capability, containment, spent fuel cooling capability, and spent fuel pool integrity. Evaluation of the survivability of these critical functions should consider not only the key components, but also power supplies, cable runs, and other components that support these functions. The assessment may take credit for the availability of both safety and non-safety equipment. The assessment should evaluate whether the structures containing equipment that provides these critical functions are likely to be affected by the specified large, commercial aircraft impact. Factors to be considered in the assessment include the size and location of the structures and the presence of external impediments to impact.

3. *Damage mechanisms.* The assessment should model the structural response, shock and vibration effects, and fire effects of the aircraft impact.

a. *Structural assessment.* The structural assessment should be based on a detailed structural model of the plant taking into account the nonlinear materials and geometric behavior. The assessment should consider both local and global (plant-wide) behavior, as well as thermal effects resulting from fire.

b. *Shock assessment.* The assessment should evaluate both the local and global (plant-wide) shock and vibration effects resulting from the aircraft impact.

c. *Fire assessment.* The fire assessment should consider the extent of structural damage and aviation fuel deposition, if any, spread within the impacted buildings. The assessment should consider both short- and long-term fire effects.

4. *Consideration of potential responsive actions and strategies in identifying design features and functional capabilities.* In determining design features and functional capabilities, the designer is expected to consider the potential responsive actions and strategies in determining what design features and functional capabilities to adopt. After considering potential actions and strategies, the designer may identify design features and functional strategies that would facilitate the implementation and/or enhance the effectiveness of such responsive actions and strategies. An objective of the rule is to ensure that practical actions and strategies that the nuclear power plant licensee could use to respond to the effects of an aircraft impact are not precluded by the design and are available as effective options through inclusion of appropriate design features and functional capabilities.

#### *Regulatory Treatment of the Assessment*

The aircraft impact assessment will be subject to inspection by the NRC and, therefore, must be maintained by the applicant along with the rest of the information that forms the basis for the relevant application, consistent with paragraph (b) of 10 CFR 52.0, "Scope; applicability

of 10 CFR Chapter I provisions,” 10 CFR 50.70, “Inspections,” and 10 CFR 50.71, “Maintenance of records, making of reports.” The applicant is not required to submit the aircraft impact assessment—as opposed to the “description of the identified design features and functional capabilities” required by 10 CFR 50.150(b) (proposed 10 CFR 52.500(c))—to the NRC in its application.

Under the final rule, the NRC will confirm that the information required by 10 CFR 50.150(b) is included in the applicant’s PSAR or FSAR, namely, the description of the design features and functional capabilities identified as a result of the assessment and a description of how those features and capabilities show, with reduced use of operator action, that the assessment requirements in 10 CFR 50.150(a)(1) are met. The NRC will review the information contained in the application and reach conclusions as to whether the applicant has: (1) adequately described design features and functional capabilities in accordance with the aircraft impact rule; and (2) conducted an assessment reasonably formulated to identify design features and functional capabilities to show, with reduced use of operator action, that the facility can withstand the effects of an aircraft impact. The NRC’s decision on an application subject to 10 CFR 50.150 will be separate from any NRC determination that may be made with respect to the adequacy of the impact assessment which the rule does not require be submitted to the NRC. Therefore, the adequacy of the impact assessment may not be the subject of a contention submitted as part of a petition to intervene under 10 CFR 2.309, “Hearing requests, petitions to intervene, requirements for standing, and contentions.” A person who seeks NRC rulemaking action with respect to a proposed standard design certification on the basis that the requirements of the rule with respect to the identification and description of design features and functional capabilities has not been met could submit comments in the notice and comment phase of that rulemaking. A person who seeks rulemaking action after the NRC has adopted a final design certification rule on the basis that the impact assessment performed for that design

certification is inadequate could submit a petition for rulemaking under 10 CFR 2.802, "Petition for rulemaking," and 10 CFR 2.803, "Determination of petition," seeking to amend the standard design certification. A person who seeks agency enforcement-related action on a combined license or manufacturing license on the basis of an inadequate impact assessment could file a petition under 10 CFR 2.206, "Requests for action under this subpart."

Applicants are only required to submit a description of the identified design features and functional capabilities identified as a result of the assessment in their PSAR or FSAR, together with a description of how the identified design features and functional capabilities comply with the rule's requirements. Applicants subject to the aircraft impact rule must make the complete aircraft impact assessment available for NRC inspection at the applicants' offices or their contractors' offices, upon NRC request in accordance with 10 CFR 50.70, 10 CFR 50.71, and Section 161.c of the Atomic Energy Act of 1954, as amended. The NRC expects that, generally, the information that it needs to perform its review of the application to assess the applicant's compliance with 10 CFR 50.150 will be that information contained in the applicant's FSAR. However, if the NRC believes, during the course of its review of the application, that the application contains incomplete or insufficient descriptions of the design features and functional capabilities included in the design, or insufficient discussions of how those features and capabilities show, with reduced use of operator action, that the facility can withstand the effects of an aircraft impact, then the NRC may request additional information or may review the assessment prior to issuance of the design certification, approval, or license, as applicable.

The NRC will confirm that the impact assessment was performed consistent with the regulatory requirements, but, consistent with the previous discussion, the NRC's confirmation will proceed independently of the NRC's licensing or approval action on the relevant application. The NRC may take appropriate enforcement action for any violations of applicable NRC requirements, including, but not limited to, 10 CFR 50.150, "Aircraft impact assessment;"

10 CFR 50.5 and 10 CFR 52.4, “Deliberate misconduct;” and 10 CFR 50.9 and 10 CFR 52.6, “Completeness and accuracy of information.” A failure to perform the assessment will be a violation of the rule. The NRC expects the assessment to be rigorous. Any assessment that is inadequate to reasonably assess the aircraft impact or to identify design features or functional capabilities could be considered a violation of the rule.

For design certifications, design approvals, and manufacturing license which are subject to and/or have been determined by the NRC to be in compliance with the aircraft impact rule, issue resolution (in accordance with the applicable NRC regulations and law) will be accorded to the aircraft impact assessment, the descriptions of the design features and functional capabilities required to be included in the application, and the description of how the identified design features and functional capabilities meet the requirements of this final rule. Furthermore, the NRC has concluded in this final rulemaking that issue resolution also extends to the exclusion of design features and functional capabilities which have not been included in the facility design. This position represents a change from the NRC’s proposed position as presented in the proposed rule’s statement of consideration (see 72 FR 56292, third column (October 3, 2007)). The NRC’s changed position on this matter stems from a review of the issue resolution provision in design certification rulemaking. Under the “Issue Resolution” section for each of the four current design certifications, the NRC included the following statement: “A conclusion that a matter is resolved includes the finding that additional or alternative structures, systems, and components, design features, design criteria, testing, analyses, acceptance criteria or justification are not necessary for the [design which is certified].” 10 CFR part 52, Appendices A through D, paragraph IV.A. There is nothing exceptional about the technical requirements in the aircraft impact rule which suggests that this provision on issue resolution should not also apply to matters addressed by the aircraft impact rule. Accordingly, as part of this final

rulemaking the NRC adopts a different position on the scope of issue resolution with respect to excluded design features and functional capabilities.

Once the applicant completes the impact assessment and identifies in the FSAR the design features and functional capabilities that it has incorporated into its design, the goal of this final rule has been achieved. Accordingly, the final rule does not require the impact assessment to be updated by either: (1) an operating license holder; (2) a design certification applicant following the NRC's adoption of a final standard design certification rule; (3) a design approval holder; (4) a manufacturing license applicant or holder whose application references a design certification or design approval; (5) a combined license applicant or holder whose application references a design certification, design approval, or manufactured reactor; or (6) a combined license or manufacturing license holder who is required to prepare its own assessment.

However, if a permit holder, licensee, approval holder, or design certification applicant makes a change to the information required to be included in their PSAR or FSAR, then they will be required to consider the effect of the change on the original assessment required by 10 CFR 50.150(a) and amend the information required to be included in the PSAR or FSAR. These requirements are discussed in more detail later in this section. Also, a construction permit holder will need to update its initial assessment when it is preparing to submit its operating license application because it is only at the operating license stage that the applicant will be seeking NRC approval of its final design. No applicant or licensee will be required to update the assessment in an application for renewal under either 10 CFR 52.57, 10 CFR 52.107, 10 CFR 52.177 or 10 CFR part 54. An applicant for renewal of one of the currently approved design certifications which has not been amended to comply with the aircraft impact rule will have to perform an aircraft impact assessment before submitting its renewal application.

### Record Retention Requirements

The provisions of 10 CFR 50.71(c) require that records that are required by the regulations in 10 CFR parts 50 or 52 must be retained for the period specified by the appropriate regulation. If a retention period is not otherwise specified, the licensee must retain these records until the Commission terminates the facility license. Because 10 CFR 50.150(a) (proposed 10 CFR 52.500(b)) requires the performance of the aircraft impact assessment, it falls under the category of “records that are required by the regulations” and therefore, the licensee will be required to retain the assessment until the Commission terminates the facility license. The NRC also expects to add specific provisions to each standard design certification rule for a design covered by 10 CFR 50.150 governing retention of the aircraft impact assessment by both the applicant for the design certification (including an applicant after the Commission has adopted a final standard design certification rule) and a licensee who references that design certification. The NRC will require applicants and licensees to retain the assessment required by 10 CFR 50.150(a) throughout the pendency of the application and for the term of the certification or license (including any period of renewal). For all applicants, the supporting documentation retained onsite should describe the methodology used in performing the assessment, including the identification of potential design features and functional capabilities to show that the acceptance criteria in 10 CFR 50.150(a)(1) will be met.

### Identification of Design Features and Functional Capabilities

The final rule requires designers of new facilities to describe how the design features and functional capabilities identified in performance of the aircraft impact assessment show, with reduced use of operator action, that the facility can withstand the effects of an aircraft impact (i.e., that the rule’s acceptance criteria are met). Plant structures critical to maintaining facility safety functions should be designed such that an impact does not result in structural failure, and aircraft parts and jet fuel do not enter the structures. In circumstances in which an impact results

in aircraft parts and jet fuel entering structures or affecting equipment, plant structures and layouts should be evaluated with respect to maintaining key safety functions (core cooling, containment, spent fuel cooling, and spent fuel pool integrity) by addressing equipment survivability following the entry of aircraft parts and jet fuel. Key safety functions should be accomplished notwithstanding the resulting internal damage from structural loads, shock and vibration, and fire.

As discussed previously, the Commission has issued orders to operating plants requiring mitigation of the effects of losing large areas of the plant from fires and explosions. These requirements include some reliance on operator actions, such as realigning systems to ensure continued core cooling following the loss of a large area. Because this final rule applies to newly designed facilities before construction of the facility, the Commission expects that improvements can be made in the plant's design that may be even more effective than operator actions credited in operating plants. Thus, these designs should have reduced reliance, relative to current operating plants, on operator actions.

Nuclear power plants are inherently very robust, secure structures designed to withstand tornadoes, hurricanes, earthquakes, floods, and other severe events. They have redundant and diverse safety equipment so that if an active component becomes unavailable, another component or system will satisfy its function. The results of the Commission's evaluation of postulated aircraft impacts on operating reactors reinforced the value of design features such as the following:

- Reinforced concrete walls
- Redundancy and spatial separation of key systems, structures and components
- Diversity of power supplies
- Compartmentalization of interior structures with pressure resisting concrete walls and doors

The NRC expects the required assessment to consider such design features and functional capabilities and of possible improvements in these and other features and capabilities for addressing aircraft impacts.

*Control of PSAR or FSAR Information*

Design features or functional capabilities credited for showing that the facility can withstand the effects of an aircraft impact should be described in Chapter 19 of the FSAR, which addresses severe accidents. The design features may include structures or features unchanged from the plant design as it existed before the aircraft impact assessment (e.g., an existing wall is found to be effective), structures or features included in the plant design but enhanced to improve the response to an aircraft impact (e.g., an existing wall is made stronger), or new structures or features added solely to address aircraft impacts (e.g., a new wall). The regulatory treatment of the design features (e.g., how changes to the features are controlled) depends on which of the previously mentioned categories apply. For example, a design feature added specifically to address the effects of an aircraft impact will be controlled only by requirements in 10 CFR 50.150(c) (proposed 10 CFR 52.502) added in this final rule or requirements that the NRC expects to add to future design certifications that will be subject to 10 CFR 50.150 (proposed 10 CFR 52.500). A safety-related structure credited in the aircraft impact assessment as a design feature will continue to be controlled by Appendix B to 10 CFR part 50, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," 10 CFR part 21, "Reporting of Defects and Noncompliance," and other regulations establishing technical and administrative requirements on the non-aircraft impact functions, in addition to the requirements for control of features to address aircraft impacts.

For all applicants and licensees subject to 10 CFR 50.150, control of changes to any design features or functional capabilities credited for showing that the facility can withstand the effects of an aircraft impact will be governed by the requirements in a new paragraph (c),

“Control of changes,” of 10 CFR 50.150. For construction permits which are subject to 10 CFR 50.150, paragraph (c)(1) requires that, if the permit holder changes the information required by 10 CFR 50.34(a)(13) to be included in the PSAR, then the permit holder must consider the effect of the changed feature or capability on the original assessment required by 10 CFR 50.150(a) and amend the information required by 10 CFR 50.34(a)(13) to be included in the PSAR to describe how the modified design features and functional capabilities continue to meet the assessment requirements in the aircraft impact rule. Because this final rule addresses a beyond-design-basis event, the NRC has determined that it is appropriate to apply the same standard to any licensee-proposed changes to features and capabilities that were applied during the original evaluation of those design features and functional capabilities.

Paragraph (c)(2) of 10 CFR 50.150 provides that, for operating licenses which are subject to the aircraft impact rule (i.e., operating licenses for which the underlying construction permits are issued after **[INSERT EFFECTIVE DATE OF FINAL RULE]**), if the licensee changes the information required by 10 CFR 50.34(b)(12) to be included in the FSAR, then the licensee shall consider the effect of the changed feature or capability on the original assessment required by 10 CFR 50.150(b) and amend the information required by 10 CFR 50.34(b)(12) to be included in FSAR to describe how the modified design features and functional capabilities continue to meet the assessment requirements in the aircraft impact rule.

Paragraph (c)(3) of 10 CFR 50.150 governs changes to a design feature or functional capability described in a standard design certification. Such changes may not be made generically except by notice and comment rulemaking (see 10 CFR 52.63, “Finality of standard design certifications,” paragraphs (a)(1) and (a)(2)) and such a change must meet one of the criteria in 10 CFR 52.63(a)(1). All referencing combined licenses must implement any generic change to a design certification rule, as required by 10 CFR 52.63(a)(3). The NRC acknowledges that the applicant for a standard design certification is not directly responsible for

maintaining the FSAR information once a final design certification rule is adopted by the NRC. Nonetheless, the NRC continues to believe, for the reasons set forth in the Supplementary Information for the first design certification rulemaking (see 62 FR 25800; May 19, 1997, at 25813-25814, 25826), that the original standard design certification applicant should be required to maintain the accuracy of the design certification information. Therefore, in future standard design certification rulemakings, the NRC expects to continue its practice of adopting a records management requirement analogous to Section X.A of the four existing standard design certification rules. In addition, any applicant for an amendment to a design certification is also subject to the records management requirement. In the case of amendment requests submitted by someone other than the original applicant, the NRC may need to develop appropriate rule language to reflect the record management responsibilities for information (including SGI and proprietary information) that was developed by applicants other than the original applicant. For combined license holders subject to 10 CFR 50.150(a) (i.e., a licensee whose application does not reference a standard design certification, standard design approval, or manufactured reactor, or that reference a standard design certification issued before the effective date of the rule which has not been amended to comply with the rule), 10 CFR 50.150(c)(4)(i) states that if the licensee changes the information required by 10 CFR 52.79(a)(47) to be included in the FSAR, then the licensee shall consider the effect of the changed feature or capability on the original assessment required by 10 CFR 50.150(a) and amend the information required by 10 CFR 52.79(a)(47) to be included in the FSAR to describe how the modified design features and functional capabilities continue to meet the acceptance criteria in the aircraft impact rule.

Paragraph (c)(4)(ii) of 10 CFR 50.150 governs combined license applicants or holders which are not subject to 10 CFR 50.150(a) and states that proposed departures from the information required by 10 CFR 52.47(a)(28) to be included in the FSAR for the referenced standard design certification are governed by the change control requirements in the applicable

design certification rule. The NRC expects to add a new change control provision to future design certification rules subject to 10 CFR 50.150 (including amendments to any of the four existing design certifications) to govern combined license applicants and holders referencing the design certification that request a departure from the design features or functional capabilities in the referenced design certification. The new change control provision will require that, if the applicant or licensee changes the information required by 10 CFR 52.47(a)(28) to be included in the FSAR for the standard design certification, then the applicant or licensee shall consider the effect of the changed feature or capability on the original assessment required by 10 CFR 50.150(a). The applicant or licensee must also describe in a change to the FSAR (i.e., a plant-specific departure from the generic design control document), how the modified design features and functional capabilities continue to meet the assessment requirements in the aircraft impact rule. An applicant or licensee's submittal of this updated information to the NRC will be governed by the reporting requirements in the applicable design certification rule. The NRC expects to continue, in future standard design certification rulemakings, its practice of adopting reporting requirements analogous to Section X.B of the four existing standard design certification rules. Licensees making changes to design features or capabilities included in the certified design may also need to develop alternate means to cope with the loss of large areas of the plant from explosions or fires to comply with the requirements in 10 CFR 50.54(hh).

Paragraph (c)(4)(iii) of 10 CFR 50.150 governs combined license applicants or holders which are not subject to 10 CFR 50.150(a) but reference a manufactured reactor which is subject to 10 CFR 50.150(a). For such applicants and licensees, proposed departures from the information required by 10 CFR 52.157(f)(32) to be included in the FSAR for the manufacturing license are governed by the applicable requirements in 10 CFR 52.171(b)(2). Paragraph (b)(2) of 10 CFR 52.171 allows an applicant or licensee who references or uses a nuclear power reactor manufactured under a manufacturing license under this subpart to request a departure

from the design characteristics, site parameters, terms and conditions, or approved design of the manufactured reactor. The Commission may grant a request only if it determines that the departure will comply with the requirements of 10 CFR 52.7 and that the special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the departure.

Generic changes for manufacturing licenses which are subject to 10 CFR 51.150(a) are addressed in 10 CFR 50.150(c)(5)(i), which states that generic changes to the information required by 10 CFR 52.157(f)(32) to be included in the FSAR are governed by the applicable requirements of 10 CFR 52.171. Under the provisions of 10 CFR 52.171, "Finality of manufacturing licenses; Information requests," the holder of a manufacturing license may not make changes to the design features or functional capabilities described in the FSAR without prior Commission approval. The request for a change to the design must be in the form of an application for a license amendment, and must meet the requirements of 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," and 10 CFR 50.92, "Issuance of amendment."

Paragraph (c)(5)(ii) of 10 CFR 50.150 governs manufacturing licenses which are not subject to 10 CFR 50.150(a). Similar to a combined license application, in a manufacturing license application referencing a design certification, departures from the information required by 10 CFR 52.47(a)(28) to be included in the FSAR for the referenced standard design certification are governed by the change control requirements in the applicable design certification rule.

There are no provisions in 10 CFR 50.150(c) governing changes to a standard design approval because a design feature or functional capability described in a standard design approval may not be changed generically except under an application for a new design approval. There are no provisions in 10 CFR part 52 for making generic changes to a standard design approval. Paragraph (a) of 10 CFR 52.145, "Finality of standard design approvals; information

requests,” states that an approved design must be used by and relied upon by the NRC staff and the Advisory Committee on Reactor Safeguards in their review of any individual facility license application that incorporates by reference a standard design approval unless there exists significant new information that substantially affects the earlier determination or other good cause. Therefore, any changes to a design feature or functional capability described in a standard design approval will be subject to review by the NRC in any application that references the design approval. Note that 10 CFR 52.131, “Scope of subpart,” states that an applicant may submit standard designs for a nuclear power reactor or major portions thereof. To the extent that a standard design approval is issued for only a portion of a nuclear power reactor, any applicant referencing that design approval will have to separately comply with the requirements of 10 CFR 50.150 for any portion of the design not addressed in the design approval issued by the NRC.

## **VI. Responses to Public Comments**

### **A. Overview of Public Comments.**

The public comment period for the proposed rule closed on December 17, 2007. The NRC received 32 comment letters on the proposed rule. Of those comments, 31 commenters were in favor of requiring aircraft impact assessments on nuclear power plants; one commenter was against requiring an aircraft impact assessment. Several commenters also endorsed other commenters’ views, where some provided comments in addition to those they endorsed. No commenters supported the rule exactly as proposed.

Due to the large number of comments received and the length of the responses provided, this section of the final rule only provides a summary of the categories of comments with a general description of the resolution of those comments. The detailed description of the

comments and the NRC responses are available electronically at the NRC's electronic Reading Room, ADAMS Accession No. ML090610124.

The proposed aircraft impact rule was published in advance of publication of draft NRC guidance for implementing the rule. The NRC indicated in the proposed rule that commenters on the proposed rule need not await the publication of the draft guidance to comment meaningfully on the proposed rule (see 72 FR 56298; October 3, 2007). The NRC only received one comment suggesting that either the proposed rule language or information on the aircraft impact characteristics which was provided in the Supplementary Information for the proposed rule prevented or significantly impeded the commenter from understanding the proposed rule or commenting on it. Moreover, as described in the following discussion, the NRC received many comments effectively (if not explicitly) directed at one or more aspects of the aircraft impact characteristics. Accordingly, the NRC concludes that the NRC provided sufficient information on the proposed aircraft impact rule to allow the public a meaningful opportunity to comment on the proposed rule's requirements.

## **B. Responses to Specific Requests for Comments.**

In Section VIII of the Supplementary Information for the proposed rule, the NRC posed eight questions for which it solicited stakeholder comments. In the following paragraphs, these questions are restated, comments received from stakeholders are summarized, and the NRC resolution of the public comments is presented.

1. *Inclusion of impact assessment in application.* The proposed rule does not require that the assessment of aircraft impacts that would be mandated by proposed 10 CFR 52.500(b) be included in the FSAR or otherwise submitted as part of the application for a standard design certification, standard design approval, combined license, or manufacturing license. However, the NRC is proposing that a description of the design features, functional capabilities, and strategies credited by the applicant to avoid or mitigate the effects of the applicable,

beyond-design-basis aircraft impact be included in the FSAR submitted with the relevant application. In addition, the FSAR must contain an evaluation of how such design features, functional capabilities, and strategies to avoid or mitigate, to the extent practicable, the effects of the applicable aircraft impact with reduced reliance on operator actions. The NRC is seeking specific comments on the desirability, or lack thereof, of requiring, in the final rule, that applicants include the aircraft impact assessment required by proposed 10 CFR 52.500(b) in the FSAR or another part of the application.

Commenters' Response: The three industry commenters who addressed this question (Nuclear Energy Institute (NEI), Morgan Lewis, and AREVA Nuclear Power (AREVA NP)) indicated that the impact assessment should not be included with the application. NEI indicated that a description [of the assessment] and the evaluation under 10 CFR 52.500(c) need to be included. In a separate comment, NEI expressed its view that the submittal on aircraft impacts would be classified as a safeguards information document.

NRC Response: The final rule does not require that the assessment of aircraft impacts be included in the PSAR or FSAR or otherwise submitted as part of the application for a construction permit, operating license, standard design certification, standard design approval, combined license, or manufacturing license. However, 10 CFR 50.150(b) does require that a description of the design features and functional capabilities credited by the applicant to show that the facility can withstand the effects of the aircraft impact be included in the PSAR or FSAR submitted with the relevant application. In addition, the PSAR or FSAR must contain a description of how such design features and functional capabilities meet the acceptance criteria in 10 CFR 50.150(a)(1). The aircraft impact assessment will be subject to inspection by the NRC and, therefore, must be maintained by the applicant along with the rest of the information that forms the basis for the relevant application. The NRC expects that, generally, the

information that it needs to perform its review of the application to assess the applicant's compliance with 10 CFR 50.150 will be that information contained in the applicant's PSAR or FSAR. For these reasons, the final rule does not require applicants to submit the aircraft impact assessment to the NRC.

2. *Acceptance criteria.* The acceptance criterion contained in proposed 10 CFR 52.500 by which the NRC may judge the required assessment and evaluation is the practicability criterion addressed in paragraph (c), that is, that the applicant must describe how the "design features, functional capabilities, and strategies avoid or mitigate, to the extent practicable, the effects of the applicable aircraft impact with reduced reliance on operator actions." The NRC is considering adding an additional acceptance criterion to proposed 10 CFR 52.500 for judging the acceptability of the applicant's aircraft impact assessment and evaluation. The NRC is seeking specific comments on the desirability, or lack thereof, of adding an additional acceptance criterion in the final rule beyond the proposed rule's practicability criterion. Such an additional acceptance criterion could read, for example:

The application must also describe how such design features, functional capabilities, and strategies will provide reasonable assurance that any release of radioactive materials to the environment will not produce public exposures exceeding 10 CFR part 100 guidelines.

Commenters' Response: Three industry commenters (NEI, Morgan Lewis, and AREVA NP) opposed the use of 10 CFR part 100 dose limits as acceptance criteria for the aircraft impact rule. NEI and Morgan Lewis asserted that the use of 10 CFR part 100 dose limits would imply that the aircraft impact is a design basis event, inasmuch as 10 CFR part 100 dose limits are used to evaluate the acceptability of design features addressing design basis events. Use of 10 CFR part 100 dose limits, therefore, could be misinterpreted and result in unnecessary expenditure of industry and NRC resources. As an alternative, NEI suggested that the NRC

adopt the following functional acceptance criteria: (1) demonstrate that the reactor core remains cooled or the containment remains intact; and (2) demonstrate that spent fuel cooling or spent fuel pool integrity is maintained.

NRC Response: The NRC agrees with the commenters' recommendations for alternative acceptance criteria and agrees that 10 CFR part 100 dose limits should not be used for the purpose of this rule. The NRC decided not to adopt an additional acceptance criterion based on 10 CFR part 100 dose limits in the final rule for the reasons outlined by the commenters, namely, that the 10 CFR part 100 limits are limits that the NRC uses to judge compliance with design basis requirements. The NRC is revising the criteria necessary to comply with the final rule consistent with one commenter's suggestion. In the final rule, applicants continue to be required to perform a design-specific assessment of the effects of the impact of a large, commercial aircraft. In addition, the final rule requires applicants to use realistic analyses to identify and incorporate into the design those design features and functional capabilities to show that, with reduced use of operator action: (1) the reactor core remains cooled or the containment remains intact, and (2) spent fuel cooling or spent fuel pool integrity is maintained. The final rule removes references to considering the practicality of including the design features and functional capabilities identified as a result of the assessment. The acceptance criteria in the rule must be shown to be met to achieve compliance with the rule's requirements.

3. *Records retention.* The proposed rule relies on the general record retention requirements in 10 CFR 50.71(c) for retention of the assessment required by proposed 10 CFR 52.500 for combined license and manufacturing license applicants subject to proposed 10 CFR 52.500. The NRC intends to similarly rely on a general design certification rule provisions for retention of the assessment required by proposed 10 CFR 52.500 for design certification applicants and combined license and manufacturing license holders that reference a

design certification. The NRC is requesting specific comments on whether, *in lieu* of the specific design certification rule provisions or reliance on 10 CFR 50.71(c), the NRC should adopt as part of the final 10 CFR 52.500 rulemaking a specific provision that would explicitly mandate the retention of the assessment. Such a provision would be included in an additional paragraph of final 10 CFR 52.500, and would set forth the proposed period of retention. Inclusion of a generic records retention requirement in final 10 CFR 52.500 would preclude the need for the NRC to include a specific records retention provision in each standard design certification subject to final 10 CFR 52.500. The NRC requests comments on whether such a provision should be included in final 10 CFR 52.500, together with specific reasons in support of the commenter's position.

The NRC also requests comments on the appropriate period for retention of the assessment, evaluation, and supporting documentation. The NRC is considering the following alternatives:

- For a standard design certification, combined license, and manufacturing license the period of NRC review prior to NRC final action on the application.
- For a standard design certification and manufacturing license, the duration of the design certification or manufacturing license (i.e., the period during which the design certification or manufactured reactor may be referenced, including any renewal).
- For a standard design certification or manufacturing license, until the licensee of the final referencing license has submitted a certification under 10 CFR 50.82(a), or the final referencing license has been terminated.
- For a combined license, when the licensee has submitted a certification under 10 CFR 50.82(a), or the combined license has been terminated.

Commenters' Response: All the industry commenters (NEI, Morgan Lewis, and AREVA NP) who commented on this question stated that the existing NRC records retention

requirements are sufficient. AREVA NP also stated that the records retention requirements should apply to design certification holders for the time that the design certification is in effect.

NRC Response: The NRC agrees with the commenters. No changes were made to the proposed rule's record retention requirements in the final rule. The final rule relies on the general record retention requirements in 10 CFR 50.71(c) for retention of the assessment for combined license and manufacturing license holders subject to 10 CFR 50.150. The NRC intends to similarly rely on general design certification rule provisions for retention of the assessment required by proposed 10 CFR 50.150 for design certification applicants and combined license and manufacturing license holders that reference a design certification.

*4. Requests to amend existing standard design certifications to address aircraft impacts.*

The NRC has concluded that it does not need to apply the proposed rule to the four currently approved standard design certifications, as discussed in detail in Section III of the Supplementary Information of the proposed rule. Nonetheless, the original applicant (or another qualified entity) may request an amendment to the standard design certification to add design features, functional capabilities, or strategies in accordance with the requirements of 10 CFR 52.500. The NRC encourages such requests for amendment by the applicants for the four current standard design certifications because it will further enhance the already high levels of safety and security provided by these reactor designs. These design modifications may be implemented in different ways as described in Section III of the Supplementary Information of the proposed rule. However, under the proposed rule, there are no standards, other than those contained in 10 CFR 52.63(a), for judging changes to the design to address the effects of an aircraft impact. The NRC requests specific comments on whether it should use the same criterion to judge amendments to an existing design certification as it would use on a new design certification applicant under the proposed 10 CFR 52.500.

Commenters' Response: One industry commenter (NEI) stated that voluntary requests to amend existing design certifications to address aircraft impacts should be held to the same standard as new design certification applications, because to do otherwise would introduce inconsistency into the regulatory process. One industry commenter (Morgan Lewis) agreed with the NEI position, adding that if the holder of an existing design certification does not voluntarily comply with the rule, then combined license applicants that reference that design certification will still be required to comply with the proposed 10 CFR 73.55 amendment, and these applicants would not receive the benefits of any design changes in response to the proposed rule on aircraft impacts. As encouraged by the proposed rule, some commenters noted that reactor vendors with existing design certifications may voluntarily request the NRC to amend the design certifications to address aircraft impacts. Some commenters stated that the NRC should use the same criteria for evaluating such requests for amendments to existing design certifications as it uses for evaluating new applications for design certifications. Some commenters also stated that combined license applicants that reference the amendment to a design certification that voluntarily complies with the aircraft impact rule should be treated the same as a combined license applicant that references a new design certification that is required to comply with the aircraft impact rule.

NRC Response: The NRC agrees with the commenters that the NRC should use the same criteria for evaluating voluntary requests for amendments to currently approved design certifications as it uses for evaluating new applications for design certifications. To ensure consistency among all new reactor designs, the NRC must apply the same criteria to voluntary requests for amendments to existing design certifications as it uses for evaluating new applications for design certifications or applications for combined licenses that reference a design certification that has not been amended to address the aircraft impact rule.

The NRC has determined, consistent with the proposed aircraft impact rule, that the four currently approved standard design certifications in Appendices A through D to 10 CFR part 52 should not be required to comply with the final aircraft impact rule during the period of effectiveness of the initial certification period. However, an applicant for renewal of one of the currently approved design certifications that has not been previously amended to comply with the aircraft impact rule must comply with the rule during renewal. Therefore, the original applicants for the four existing design certifications (or their successors in interest) are not required to submit applications to recertify their designs as complying with the final aircraft impact rule, except at renewal if the certifications have not voluntarily been amended previously. However, based upon NRC's consideration of public comments and its assessment of alternative regulatory approaches for ensuring that all newly designed and constructed nuclear power plants comply with the aircraft impact rule, the NRC has decided that the best regulatory approach is to require any combined license applicant referencing one of these four existing design certifications to comply with the aircraft impact rule, unless the referenced design certification has been amended to comply with the aircraft impact rule.

The NRC's decision on the regulatory approach for achieving the objective that all newly-designed and constructed nuclear power plants comply with the aircraft impact rule stems from: (1) NRC's acknowledgement of the view - expressed by a wide range of stakeholders - that public confidence in future nuclear power reactors will be enhanced by requiring all newly-constructed nuclear power plants, including those based upon one of the four currently approved design certifications, to meet the requirements of the aircraft impact rule; and (2) NRC's assessment that there appears to be little or no commercial interest at this time by domestic U.S. entities in using certain design certifications. The NRC agrees with the view, expressed by many stakeholders across a wide spectrum of interests and background, that the underlying objectives of the aircraft impact rule would not be fully achieved if a subset of future nuclear power plant

applicants—namely, those applicants who reference one of the four existing design certifications—are not required to comply with the aircraft impact rule. Thus, the NRC has decided that all future nuclear power plants to be constructed and operated in the U.S. should use designs which comply with the final aircraft impact rule. However, given that objective, the NRC believes that it should adopt a regulatory approach for achieving that objective in a manner that does not unduly affect the resource planning of potential combined license applicants considering referencing one of the currently approved design certifications. To adopt a regulatory approach which mandates a delay in NRC action on a combined license application referencing one of the four currently approved until that design certification is amended to comply with the aircraft impact rule seems unduly restrictive, especially where the combined license applicant is ready and willing to comply with the aircraft impact rule. Accordingly, the NRC determined that it would adopt the regulatory approach reflected in the final rule.

5. *Applicability to future 10 CFR part 50 license applicants.* The NRC is proposing to apply the requirements in proposed 10 CFR 52.500 to 10 CFR part 52 applicants only, specifically, to applicants for standard design certifications issued after the effective date of the final rule that do not reference a standard design approval; standard design approvals issued after the effective date of the final rule; combined licenses issued after the effective date of the final rule that do not reference a standard design certification, standard design approval, or manufactured reactor; and manufacturing licenses issued after the effective date of the final rule that do not reference a standard design certification or standard design approval. However, the NRC is considering extending the applicability of the proposed 10 CFR 52.500 requirements to future applicants for construction permits under 10 CFR part 50. The NRC requests specific comments on the desirability, or lack thereof, of extending, to future 10 CFR part 50 construction permit applicants, the applicability of the proposed requirements to perform an aircraft impact assessment and to evaluate the design features, functional capabilities, and strategies to avoid

or mitigate, to the extent practicable, the effects of the applicable, beyond-design-basis aircraft impact.

Commenters' Response: One industry commenter (NEI) recommended that future applicants for new construction permits under 10 CFR part 50 should be required to meet the rule, but that current holders of construction permits, including those whose plants are essentially complete, should not be required to comply with the rule. The commenter suggested that plants with an existing construction permit and plants where construction is essentially complete should be subject to the same requirements as operating plants, which are required to have mitigation actions for large area fires and explosions. To require otherwise would be impractical and result in a financial burden in changing a design that is essentially built.

NRC Response: The NRC agrees with the commenter that future applicants for new construction permits under 10 CFR part 50 should be required to meet the rule, but that current holders of construction permits should not be required to comply with the rule. The NRC is making the final rule applicable to 10 CFR part 50 license applicants as well as applicants under 10 CFR part 52 to maintain consistency in the technical requirements that are applied to new applicants under 10 CFR parts 50 and 52. The final rule requires both new power reactor construction permit applicants and operating license applicants to perform the required assessment and include the description of the identified design features and functional capabilities in their applications. The final rule is being applied to applicants at both construction permit and operating license stage because it is not until the operating license stage that the applicant is required to provide the NRC with its final design. The NRC can issue a construction permit based on preliminary design information. Therefore, the NRC believes it is necessary to require applicants to perform the aircraft impact assessment at both stages and to include the required information in both applications based on the level of design information available at the time of each application.

In making these additions, the NRC is making it clear that the requirements are not meant to apply to operating license applications for which construction permits were issued before the effective date of this final rule. This is because existing construction permits are likely to involve designs which are essentially complete and may involve sites where construction has already taken place. Applying the final rule to operating license applications for which there are existing construction permits could result in an undue financial burden to change a design for a plant that is partially constructed. Such a financial burden is not justifiable in light of the fact that the NRC considers the events to which the aircraft impact rule is directed to be beyond-design-basis events and compliance with the rule is not needed for adequate protection to public health and safety or common defense and security. Moreover, such operating license applicants will be required to comply with the requirements in 10 CFR 50.54(hh) to identify actions to mitigate the effects of large fires and explosions, including those caused by aircraft impacts. For these reasons, the NRC is not requiring operating license applicants with an existing construction permit to comply with the final rule.

6. *Addition of technical requirements to 10 CFR part 52.* In the recent revision to 10 CFR part 52, the NRC took a comprehensive approach to reorganizing 10 CFR part 52 and making conforming changes throughout 10 CFR Chapter I, "Nuclear Regulatory Commission," to reflect the licensing and approval processes in 10 CFR part 52. In that rulemaking, the NRC reviewed the existing regulations in 10 CFR Chapter I to determine if the existing regulations needed to be modified to reflect the licensing and approval processes in 10 CFR part 52. In making conforming changes involving 10 CFR part 50 provisions, the NRC adopted the general principle of keeping the technical requirements in 10 CFR part 50 and maintaining all applicable procedural requirements in 10 CFR part 52. This proposed aircraft impact rule represents a departure from that general principle in that it proposes to include specific technical requirements in 10 CFR part 52 and would create a separate subpart for inclusion of future,

similar, technical requirements. The NRC is considering relocating the proposed aircraft impact requirements from 10 CFR 52.500 to a new section in 10 CFR part 50 to maintain the general principle it established in the comprehensive 10 CFR part 52 rulemaking. The NRC requests specific comments on the desirability, or lack thereof, of relocating the proposed aircraft impact requirements from 10 CFR 52.500 to a new section in 10 CFR part 50.

Commenters' Response: One industry commenter (NEI) stated that the requirements should be placed in 10 CFR part 52 because the assessment relates to a beyond-design-basis event and is intended to apply to design certifications. One industry commenter (Morgan Lewis) generally agreed with NEI, but stated if the aircraft impact rule's requirements are to be imposed on future 10 CFR part 50 construction permit applicants, then the requirements should be included in 10 CFR part 50, consistent with the general principle established in the recent 10 CFR part 52 rulemaking (72 FR 49352; August 28, 2007).

NRC Response: The NRC is relocating the aircraft impact requirements from 10 CFR 52.500 as proposed to new section 10 CFR 50.150. Similarly, requirements for the control of changes to FSAR information is relocated from 10 CFR 52.502 as proposed to 10 CFR 50.150(c). These sections were relocated to maintain the general principle that the NRC established in the comprehensive 10 CFR part 52 rulemaking, that is, to maintain the technical requirements in 10 CFR part 50 for plants licensed under 10 CFR part 52. Furthermore, because the final rule is also applicable to applicants for new construction permits and operating licenses under 10 CFR part 50, the relocation of the aircraft impact assessment requirements to 10 CFR part 50 is necessary.

*7. Applicability to design approvals and manufacturing licenses.* The proposed rule would apply to future design approvals or manufacturing licenses. In the recent comprehensive rulemaking on 10 CFR part 52, the NRC strived for a high level of consistency in the requirements for design certifications, design approvals, and manufacturing licenses, given the

similarity in the regulatory functions of these three processes. However, it is not clear that there will be future design approval applications, in light of the NRC's recent determination to remove the design approval as a prerequisite for obtaining a design certification. Similarly, there does not appear to be any near-term interest in obtaining a manufacturing license for the manufacture of a nuclear power plant. Therefore, the NRC is considering eliminating the applicability of the proposed 10 CFR 52.500 requirements to future applicants for design approvals and manufacturing licenses. The NRC requests specific comments on the desirability, or lack thereof, of eliminating the applicability of the proposed 10 CFR 52.500 requirements to future applicants for design approvals and manufacturing licenses.

Commenters' Response: One industry commenter (NEI) stated that the proposed rule's requirements should not be applied to future applicants for design approvals and manufacturing licenses, but provided no rationale for its recommendation. One industry commenter (Morgan Lewis) indicated that this issue is difficult to evaluate at this time, and it would be better to defer consideration of this issue, inasmuch as the NRC could later amend the rule as necessary.

NRC Response: The NRC disagrees with the commenters because the scope of and reviews for design approvals and manufacturing licenses are essentially the same as for design certifications. The NRC sees no benefit in deferring the decision on applicability to design approvals and manufacturing licenses to a later time. Therefore, the final rule applies to future design approval or manufacturing license applicants.

8. *Scope of design evaluated.* The proposed 10 CFR 52.500 would be applicable to all standard design certifications, standard design approvals, and manufacturing licenses issued after the effective date of the final rule and to all combined licenses issued after the effective date of the final rule that do not reference a standard design certification, standard design approval, or manufacturing license. However, the proposed rule does not address the difference in the scope of the facility design that would be considered by an applicant for a standard design

certification, standard design approval, or manufacturing license and the scope of the design that would be considered by a combined license applicant. For a standard design certification, standard design approval, or manufacturing license, the applicant is required to address only a subset of the facility design that a combined license applicant is required to address. In general, a design certification, design approval, or manufacturing license applicant is required to address such items as the reactor core, reactor coolant system, instrumentation and control systems, electrical systems, containment system, other engineered safety features, auxiliary and emergency systems, power conversion systems, radioactive waste handling systems, and fuel handling systems. In contrast, a combined license applicant also must address site-specific design features, such as the ultimate heat sink. Combined license applicants that do not reference a design certification, design approval, or manufactured reactor could address such site-specific design features in their evaluation of design features, functional capabilities, and strategies to avoid or mitigate, to the extent practicable, the effects of the applicable aircraft impact with reduced reliance on operator actions. However, the proposed rule does not impose any requirements on a combined license applicant that references a design certification, design approval, or manufactured reactor with regard to addressing the potential effects of an aircraft impact on such site-specific portions of the design. The proposed rule could, therefore, introduce an inconsistency in the treatment of combined license applicants that reference a design certification, design approval, or manufactured reactor and combined license applicants that submit a custom design. Therefore, to ensure consistent treatment of all combined license applicants, the NRC is considering an alternative approach in the final rule. One approach that the NRC is considering is to adopt additional requirements for combined license applicants that reference a design certification, design approval, or manufactured reactor that would require such applicants to evaluate that portion of the design excluded from the design certification, design approval, or manufactured reactor for additional design features, functional capabilities,

or strategies to avoid or mitigate, to the extent practicable, the effects of the applicable aircraft impact with reduced reliance on operator actions. Alternatively, the NRC is considering limiting the scope of the evaluation for combined license applicants not referencing a design certification, design approval, or manufactured reactor to that portion of the design that would otherwise be covered in a design certification, design approval, or manufacturing license application, which would include the majority of the facility considered most vulnerable to an aircraft impact. The NRC requests specific comments on the desirability, or lack thereof, of adopting one of these alternative approaches in the final rule.

Commenters' Response: Two industry commenters (NEI and Morgan Lewis) argued that the scope of the aircraft impact assessment for combined license applicants should be the same scope as the assessment required for a new design certification. This would ensure consistency among all combined license applicants regardless of whether they reference or not reference a design certification, and would cover the majority of the portion of the plant design which is considered most vulnerable to an aircraft impact.

NRC Response: The NRC disagrees with the commenters. The NRC believes that the greatest benefit from implementation of this final rule will be achieved by having each applicant consider as much of the facility design as possible when it is performing the aircraft impact assessment. Design certification, design approval, and manufactured reactor applicants will only logically be able to consider that part of the facility design within the scope of the certification, approval, or license. However, combined license applicants that do not reference a design certification, design approval, or manufactured reactor, or reference one of the four currently approved design certifications which has not been previously amended to comply with the aircraft impact rule, will have the entire facility design available for consideration. This means, as a practical matter, that the scope of the overall plant design which is subject to the aircraft impact rule's requirements may be greater for a "custom" combined license applicant

who does not reference a design certification, design approval, or manufactured reactor. The NRC believes it is preferable to benefit from this broader review for those combined license applicants that must perform the aircraft impact assessment than it is to limit their review to the scope of the design that would otherwise be considered by, for example, a design certification applicant. The NRC believes its approach is preferable to that suggested by the commenters even though it results in combined license applicants that reference a certified design, design approval, or manufactured reactor assessing a different scope of the facility design than a “custom” combined license applicant. The NRC believes that, as a result of such an approach, combined license holders that reference a certified design, design approval, or manufactured reactor will likely need to do more work to comply with the proposed requirements for licensees to develop and adopt mitigative strategies to cope with large fires and explosions in 10 CFR 50.54(hh) than will a “custom” combined license holder that has assessed the entire facility at the design stage in accordance with this final rule. For these reasons, the NRC has not made any changes to the assessment requirements for combined license applicants in the final rule.

### **C. Responses to Remaining Comments.**

The comments were separated into 11 categories based on their relevance to particular topics. The comments and responses contained in the first category are summarized in Section VI.B of the Supplementary Information of this document. The comments and responses contained in the second through the eleventh category are summarized in the following paragraphs.

The second category addresses the overall need to address aircraft impacts. Some commenters supported, while others opposed, requiring an aircraft impact assessment. No changes were made to the proposed rule as a result of these comments. The NRC believes that

requiring new plant designers or combined license applicants to perform this assessment will result in new plants having additional inherent protection against the effects of an aircraft impact.

The third category addresses the scope of applicants and licensees that the rule is applicable to. Some commenters suggested that the rule should also apply to all currently operating nuclear power reactors, reactors with spent fuel in onsite pool storage structures, combined license applicants (regardless of the design being referenced), and currently approved design certifications. Other commenters suggested not applying the rule to currently operating reactors. The final rule does not apply to currently operating reactors but does apply to all applicants for new nuclear power reactors. It also applies to the four currently approved design certifications, but only at renewal if they have not been voluntarily amended to comply with the aircraft impact rule.

The fourth category addresses adequate protection and consideration of aircraft impacts as a beyond-design-basis event. Some commenters agreed that aircraft impacts should be treated as a beyond-design-basis event, while others opposed the treatment of aircraft impacts as a beyond-design-basis event. Others suggested that NRC does not have the statutory authority to require consideration of the effects of an action in the nature of an attack by an enemy of the U.S. The NRC did not make any change to the proposed rule's treatment of these issues. The final rule continues to identify an aircraft impact as a beyond-design-basis event.

The fifth category addresses the Commission's specified aircraft characteristics. Some commenters suggested that the general description of aircraft characteristics is adequate, whereas others suggested that the proposed aircraft characteristics are not adequate. The description of the aircraft characteristics has not changed in the final rule.

The sixth category addresses the aircraft impact assessment. Some commenters suggested that the assessment needs to consider all real consequences of the aircraft impact, while other commenters suggested that the assessment should use standardized and validated

models and be based on practical and realistic criteria, assumptions, and methodologies. The assessment requirements are not changed from the proposed rule. The final rule requires the assessment to be rigorous and performed using realistic assumptions.

The seventh category addresses the evaluation of design features, functional capabilities, and strategies as described in the proposed rule. Some commenters suggested providing acceptance criteria in the rule, clarifying the NRC's intent in using the term "avoid," requiring features which would prevent the impact from occurring, preventing the applicant from implementing design tradeoffs which would negatively impact safety, and providing additional guidance on the intent of the terms "to the extent practical" and "reduced reliance on operator actions." The final rule does provide explicit acceptance criteria to judge the results of the assessment and eliminates the use of the phrases "avoid or mitigate" and "to the extent practical." In addition, the final rule provides additional clarification on the intent of the term "reduced use of operator actions."

The eighth category addresses issue resolution and regulatory implementation issues. Some commenters suggested that the final rule should clarify that the assessment and evaluation are part of the design certification rulemaking and provide issue resolution for subsequent combined license applicants, and that contentions on their adequacy will not be entertained in individual combined license proceedings. Other commenters suggested that the aircraft impact assessment need not be updated as part of a license renewal application, and others suggested that the design features incorporated into the design under a design certification are not part of the plant's physical security requirements and, therefore, not subject to review at the combined license stage. The final rule reflects that the NRC will review the information required to be submitted under 10 CFR 50.150(b) and will accord issue resolution. The NRC agreed, in general, with the comment that the aircraft impact assessment need not be updated as part of a license renewal application, with one exception. The NRC has added

provisions in the final rule that have the effect of requiring each of the four currently approved design certifications to comply with the aircraft impact rule at the time of renewal, if that design has not been previously amended to comply with the aircraft impact rule. The NRC agrees that the design features selected by the designer and incorporated into a design certification are not subject to review at the combined license stage from the standpoint of compliance with the aircraft impact rule. However, the NRC disagrees with the view that design features incorporated into a design certification as a result of the aircraft impact rule would not be subject to a physical security review under 10 CFR part 73 during a combined license application proceeding where the design certification is referenced.

The ninth category addresses protection of safeguards and other sensitive information. Some commenters suggested that the aircraft characteristics should not be provided in the rule nor should details of the design features that protect against aircraft impacts be described in licensing applications. One commenter suggested that the proposed rule's failure to provide detailed aircraft parameters prevents meaningful involvement from the public and experts in industry and academia, and that the relevant September 11, 2001 aircraft parameters have been previously published in publicly available government documents. The NRC maintains the position from the proposed rule that the general information on aircraft characteristics provided in the rule is sufficient for the purposes of public comment, and no changes were made to the final rule as a result of these comments.

The tenth category addresses compliance with the National Environmental Policy Act. Some commenters suggested that the NRC should prepare an environmental impact statement because the rule is a major federal action significantly affecting the environment and should consider alternatives to the proposed rule. The final rule did not change as a result of these comments because the rulemaking does not constitute a "major federal action significantly affecting the quality of the human environment."

The eleventh category addresses other comments that did not logically fit into the other categories. Commenters suggested considering other threats, not permitting siting of new reactors within 5 miles of an airport, and that the aircraft impact assessment is an aging-related matter. The final rule did not change as a result of these comments.

## **VII. Section-by-Section Analysis**

### **§ 50.8 Information collection requirements: OMB approval**

This section, which lists all information collections in 10 CFR part 50 which have been approved by the Office of Management and Budget (OMB), is revised by adding a reference to 10 CFR 50.150, the aircraft impact rule. As discussed below, under the Paperwork Reduction Act Statement, the OMB has approved the information collection and reporting requirements in the final aircraft impact rule. No specific requirement or prohibition is imposed on applicants or licensees in this section.

**§ 50.34 Contents of construction permit and operating license applications; technical information.**

This section describes the technical information which must be provided in applications for construction permits and operating licenses subject to 10 CFR 50.150. New paragraphs (a)(13) and (b)(12) require each application for a construction permit and operating license subject to the aircraft impact rule to include the information required to be submitted to the NRC by 10 CFR 50.150.

### **§ 50.150 Aircraft impact assessment.**

The aircraft impact rule, § 50.150, is a new requirement applicable at the design stage for new nuclear power facilities. The aircraft impact rule requires a design-specific assessment of the effects on the facility of the impact of a large, commercial aircraft, and incorporation of design features and functional capabilities to show (using realistic analyses), with reduced use of operator actions, that: (1) the reactor core remains cooled or the containment remains intact;

and (2) spent fuel cooling or spent fuel pool integrity is maintained. The aircraft impact rule was included in 10 CFR part 52 and designated as 10 CFR 52.500 at the proposed rule stage, but is now included in 10 CFR part 50 and redesignated as 10 CFR 50.150. This is consistent with the NRC's intention that this technical requirement applies to licenses under part 50 as well as licenses and regulatory approvals under part 52.

Paragraph (a) Assessment requirements.

Paragraph (a) sets forth the requirements for an assessment of aircraft impact to be applied to the design of new nuclear power facilities. Paragraph (a) also contains the key provisions relating to the nature of the aircraft impact characteristics to be utilized when performing the assessment. The requirements relating to the assessment are separated into two paragraphs, (a)(1) and (a)(2), to help readers distinguish between the assessment of aircraft impact, and the characteristics of the aircraft impact that must be used by the facility designer in performing the assessment. Finally, paragraph (a)(3) lists the licenses, certifications, and regulatory approvals involving nuclear power reactor design to which the assessment requirements in paragraph (a) apply.

Paragraph (a)(1) Assessment.

Paragraph (a)(1) requires a design-specific assessment of the effects of an impact of a large, commercial aircraft on a nuclear power reactor facility. As discussed in the section-by-section analysis for paragraph (a)(3), every new nuclear power plant will meet the aircraft impact rule, which is one of the NRC's key objectives.

Conceptually, the assessment required by the aircraft impact rule has two aspects. The first is consideration of the effects on the facility of the impact of a large, commercial aircraft. The second aspect is a showing that design features and functional capabilities incorporated into the design meet, with reduced use of operator actions, the acceptance criteria in paragraphs (a)(1)(i) and (ii). The designer may perform both aspects of the assessment using realistic analyses (discussed in greater detail below). The aircraft impact characteristics that must be

used by the designer in performing the assessment are defined in paragraph (a)(2) of the rule. In showing that the design features and functional capabilities incorporated into the design meet the requirements of paragraph (a), the designer should use a structured process requiring consideration of the insights gained when assessing the effects on the facility of the aircraft impact. The NRC recognizes that a designer's approach for implementing the rule may differ, depending upon the stage of completion of the facility design when this final rule is adopted or the design process that the designer chooses to employ. For example, if a facility design is largely or entirely completed when this rule becomes effective—as in the case of the current design applications under review by the NRC—the designer may focus on features and capabilities already included in the design or on potential enhancements of such features and capabilities, and then identify any additional features and capabilities. By contrast, a designer who has not yet commenced detailed design activities may decide to use an iterative screening process for identifying features and capabilities. By setting forth performance-based objectives, the aircraft impact rule does not require the designer to use a specific methodology, process or approach for identifying design features and functional capabilities that meet the acceptance criteria in paragraph (a)(1)(i) and (ii) with reduced use of operator actions. The designer may choose any number of ways to meet these performance requirements.

By a “design-specific” assessment, the NRC means that the impact assessment must address the specific design of the facility which is either the subject of a construction permit, operating license, standard design certification, standard design approval, combined license, or manufacturing license application. The aircraft impact rule uses the term, “facility,” for convenience, although the NRC recognizes that the scope of design addressed in a design approval, design certification, and manufactured reactor may be less than the complete facility and will be limited to non-site-specific portions of the facility.

In performing the assessment, the aircraft rule specifies that “realistic analyses” be used. Analyses include both quantitative methods and approaches, either deterministic or probabilistic,

and qualitative methods and approaches, including the use of expert panels. An assessment may use quantitative and/or qualitative analyses. Regardless of the method or combination of methods employed by the designer, it must be reasonable and technically acceptable. This can be shown by demonstrating that the analytical techniques being used are generally accepted by the relevant professional/technical practitioners for performing best-estimate analysis for the given application. An analysis may not be rejected by the NRC in a licensing or rulemaking (design certification) proceeding (or otherwise challenged by an interested person in a hearing contention) on the basis that a more accurate analysis (i.e., one that more closely reflects actual data or more accurately models a known physical phenomenon) is possible. In this context, “realistic” is a relative term and is simply intended to avoid requiring the designer to utilize conservative or bounding assumptions in recognition of the NRC’s determination that the impact of a large, commercial aircraft is a beyond-design-basis event. However, the designer is free to utilize bounding or more conservative approaches in order to account for uncertainties, or to reduce the cost of analysis at its option. The NRC may not require, and an interested person in a hearing contention or in a design certification rulemaking comment may not argue, that the designer must use a conservative, as opposed to a realistic, analysis, or vice versa. Rather, the NRC’s review should be focused on (and any interested person in a hearing contention may only raise an issue with respect to) whether the designer’s analyses are within the bounds of known data, known physical phenomena, and use professionally-accepted approaches.

“Design features and functional capabilities” represent design alternatives that could be included in the design of a facility. Design features are structures, systems, and components (SSCs), including the physical arrangement of such SSCs. Examples of design features are major structures such as reinforced concrete walls and slabs; redundancy and spatial separation of key SSCs; and diversity of power supplies. Functional capabilities are key characteristics of such SSCs that result in their contribution to withstanding the effects of the aircraft impact. Examples of such functional capabilities are the flow capacity of a pump, the load carrying

capacity of a wall, and the electrical capacity of power supplies. When identifying potential design features and functional capabilities for inclusion in the design, the designer is expected to consider whether these design features and functional capabilities would facilitate the implementation and/or enhance the effectiveness of practical responsive and mitigation actions that the nuclear power plant licensee could implement. For example, if the designer determines that a fire load due to the aircraft impact in a specific area could be extinguished or controlled through the placement of a standpipe and hose near the area, or that a fire affecting critical components with a limited time-temperature rating could be more quickly controlled with a larger amount of water delivered through a larger than normally-specified pipe, then the designer should consider the design feature of a new standpipe and hose, or the functional capability of a greater capacity (larger diameter) pipe.

The aircraft impact rule establishes two sets of acceptance criteria in paragraph (a)(1), each containing two sub-criteria:

- (i) the reactor core remains cooled, or the containment remains intact; and
- (ii) spent fuel cooling or spent fuel pool integrity is maintained.

The acceptance criteria in both paragraphs (a)(1)(i) and (ii) must be met in order for the NRC to find that the requirements of the aircraft impact rule have been satisfied; it is not sufficient, for example, to satisfy the criterion of paragraph (a)(1)(i) but to fail the criterion of paragraph (a)(1)(ii).

Each criterion is expressed in the form of an alternative: within each criterion, only one of the sub-criteria needs to be satisfied in order to show compliance with the aircraft impact rule. The order of the sub-criteria does not reflect any requirement with respect to the logical order in which the NRC expects a designer to determine if each criterion is satisfied. For the first criterion in paragraph (a)(1)(i), the NRC prefers that designers identify design features and functional capabilities to demonstrate that, with reduced use of operator actions, the reactor core remains cooled. If core cooling can be maintained with the identified design features and

functional capabilities (and with reduced use of operator action), then the designer need not identify and incorporate design features and functional capabilities to show that the containment remains intact. Otherwise, the designer must identify design features and functional capabilities that show that the containment remains intact. Likewise, a designer is afforded the flexibility under the aircraft impact rule of truncating the analysis and simply demonstrating that the containment remains intact.

For the second criterion in paragraph (a)(1)(ii), the NRC prefers that designers identify and incorporate design features and functional capabilities to demonstrate that, with reduced use of operator action, spent fuel pool integrity is maintained. If the applicant can show that spent fuel pool integrity can be maintained with the applicant's identified design features and functional capabilities, then no further consideration of design features and functional capabilities to maintain spent fuel cooling is necessary. However, if spent fuel pool integrity cannot shown to be maintained, then spent fuel cooling must be maintained. Likewise, the aircraft impact rule affords the designer the flexibility of simply showing that spent fuel cooling can be maintained without first considering spent fuel pool integrity. The NRC reiterates, however, that the aircraft impact assessment must consider the effects of the aircraft impact on all four key safety functions—core cooling, containment, spent fuel cooling, and spent fuel pool integrity.

There are only two bases for either an NRC determination or an interested person's contention that the acceptance criteria in paragraph (a)(1) have not been met. One is that the analyses utilized by the designer in showing that the acceptance criteria have been met are not technically acceptable. The other basis is that the design features and functional capabilities overall do not involve any reduced use of operator actions. The NRC does not expect each design feature and functional capability incorporated into the design to involve reduced use of operator actions; the overall reduction in use of operator actions must be judged for the complete set of design features and functional capabilities relied upon in the assessment to

show that both acceptance criteria in paragraph (a)(1)(i) and (ii) have been met. However, as discussed below, the NRC does not intend that the use of operator actions be reduced without consideration of countervailing considerations. In addition, the NRC does not intend to require consideration – much less inclusion in its design – of a design feature or functional capability that could have adverse safety or security consequences under a different operational or accident scenario.

The acceptance criteria in paragraph (a)(1) focus on the functions of core cooling capability, containment, spent fuel cooling capability, and spent fuel pool integrity following the aircraft impact. These four functions are applicable to light water reactors (LWRs), and each may not be applicable to non-LWR reactor designs, or may have to be supplemented by other key functions. When reviewing non-LWR designs, the NRC will evaluate the applicability of the acceptance criteria set forth in the aircraft impact rule and the possible need for other criteria. If necessary, the NRC will issue exemptions and impose supplemental criteria to be used in the aircraft impact assessment for such non-LWR designs. The NRC believes this regulatory approach is preferable to excluding non-LWRs from the applicability of the aircraft rule, because such an exclusion could be interpreted in an erroneous manner as reflecting the NRC's belief that non-LWRs need not be designed against large, commercial aircraft impacts.

The design features and functional capabilities selected by the designer must show that the acceptance criteria in the aircraft impact rule can be met with “reduced use of operator action.” In this context, “operator action” includes actions of operators in the control room or at alternative control panels or control areas to control the reactor and the nuclear facility. This means that active operator intervention and initiation of responsive action to maintain core cooling or an intact containment, and spent fuel cooling or spent fuel pool integrity should be reduced. The designer need not strive to achieve the absolute minimum in operator action. The NRC recognizes that there may be countervailing considerations that weigh against reducing to the absolute minimum the use of operator action to show that the acceptance criteria in the

aircraft impact rule are met. The NRC expects the designer to identify and consider in a reasonable process the goal of incorporating design features and functional capabilities which achieve the acceptance criteria in paragraph (a)(1)(i) and (ii) with reduced use of operator action.

Paragraph (a)(2) Aircraft impact characteristics.

The assessment required by paragraph (a) of the aircraft impact rule must be based on the aircraft impact characteristics specified in paragraph (a)(2). The characteristics of the aircraft impact must be that of a large, commercial aircraft used for long distance flights in the United States, with aviation fuel loading typically used for such flights. The rule refers to long distance flights “in the United States,” which means those which originate and terminate in the United States (i.e., domestic flights).

The NRC’s guidance on the aircraft impact characteristics will be contained in guidance documents. The guidance will include the time-force curve, or loading function, that is derived from the aircraft impact characteristics for use in applicants’ assessment of the aircraft impact. In the case of a combined license applicant that is required to perform an aircraft impact assessment, the applicant could take credit for site-specific topographic features (e.g., mountains) and siting features (e.g., the existence of non-plant structures) to limit the directions from which the plant could experience an impact.

Footnote 1 to paragraph (a)(2) states that changes to the detailed parameters on aircraft impact characteristics set forth in guidance shall be approved by the Commission. This footnote ensures that changes to the guidance on the aircraft characteristics will not be made without Commission consideration and approval.

Paragraph (a)(3) Applicability.

As set forth in paragraph (a)(3), the assessment requirement for the aircraft impact rule applies to: (1) construction permits under 10 CFR part 50 issued after **[INSERT EFFECTIVE DATE OF FINAL RULE]**; (2) operating licenses for which the underlying construction permits

were issued after **[INSERT EFFECTIVE DATE OF FINAL RULE]**; (3) design certifications issued after **[INSERT EFFECTIVE DATE OF FINAL RULE]**; (4) the four currently-approved design certifications in 10 CFR part 52, appendices A through D at the time of renewal, but only if they have not been amended to comply with the aircraft impact rule by that time; (5) standard design approvals issued after **[INSERT EFFECTIVE DATE OF FINAL RULE]**; (6) combined licenses issued under 10 CFR part 52 which either do not reference a standard design certification, standard design approval, or manufactured reactor, or reference one of the four currently approved design certifications if the referenced design has not been amended to comply with the aircraft impact rule; and (7) manufacturing licenses that do not reference a standard design approval or standard design certification meeting the requirements of this section.

Applicants for operating licenses under part 50 whose underlying construction permits were issued before the aircraft impact rule need not (but may voluntarily choose to) comply with the aircraft impact rule. The NRC notes that the applicability of the aircraft impact rule is dependent upon the date of the NRC's final action on an application, and not the date of filing of the application. Thus, a combined license issued after the effective date of the final 10 CFR 50.150 rule will be subject to the requirements of the rule, even if its application was filed before the effective date of the final 10 CFR 50.150 rule.

Combined licenses and manufacturing licenses which do not reference a standard design certification meeting the requirements of this rule are subject to the assessment requirement in paragraph (a)(1). However, combined license applicants that choose to reference a design for which a design certification application has been docketed but not granted need not perform the assessment required by paragraph (a), assuming that the combined license which is issued references a final design certification rule which complies with the aircraft impact rule. This is an acknowledgement that, under 10 CFR 52.55(c), an applicant for a combined license may, at its own risk, reference in its application a design for which a

design certification application has been docketed but not granted.

Certain combined license applicants need not perform a plant-specific assessment to comply with the aircraft impact rule. If the combined license application references a design certification, design approval, or manufactured reactor which complies (or will comply, upon amendment of the design certification by the time of issuance of the combined license) with the assessment requirements of the aircraft impact rule, then the combined license applicant need not perform an assessment to comply with the aircraft impact rule. This means, as a practical matter, that the scope of the overall plant design which is subject to the aircraft impact rule's requirements may be greater for a "custom" combined license applicant who does not reference a design certification, design approval, or manufactured reactor which complies (or will comply) with the aircraft impact rule.

Analogous to the combined license applicant, a manufacturing license applicant who does not reference a standard design certification or standard design approval which has complied with the aircraft impact rule, must comply with the aircraft impact rule by performing the assessment required by 10 CFR 50.150(a). The scope of the assessment is limited to the scope of the design of reactor to be approved for manufacture.

The four currently approved design certifications are not required to comply with the aircraft impact rule except upon renewal if the design certification has not already been amended to comply with the aircraft impact rule. The original design certification applicant may, at any time, voluntarily request an amendment to the design certification rule to recertify the design certification as complying with the aircraft impact rule. The NRC notes that persons or entities other than the original design certification applicant may also request such an amendment of one of the four currently approved design certifications. However, such an application must provide the full set of information required by the aircraft impact rule, including, as necessary, information which substitutes for the proprietary and safeguards information provided in the original design certification proceeding, but which is not available for use in the

design certification amendment proceeding. The amendment of the design certification to reflect compliance with the aircraft impact rule will be accomplished through rulemaking.

As a result of these provisions, every newly-constructed nuclear power plant will meet the aircraft impact rule, which is the NRC's key objective in adopting this final aircraft impact rule.

Paragraph (b) Content of application.

Paragraph (b) requires the PSAR or FSAR for each license, certification, and regulatory approval application which is subject to 10 CFR 50.150(a) to include certain specified information related to compliance with the rule. This information consists of: (1) a description of the design features and functional capabilities which the applicant has selected (identified) for inclusion in the design to show that the facility can withstand the effects of the aircraft impact; and (2) a concise description of how the identified design features and functional capabilities meet the assessment requirements in 10 CFR 50.150(a)(1). The application should summarize the bases for the applicant's determination that the selected features and capabilities incorporated into the facility design show, with reduced use of operator actions, that the acceptance criteria in 10 CFR 50.150(a)(1) are met. The 10 CFR 50.150(b) information must be included in the PSAR or FSAR in accordance with 10 CFR 50.34(a)(13), 10 CFR 50.34(b)(12), 10 CFR 52.47(a)(28), 10 CFR 52.79(a)(47), 10 CFR 52.137(a)(26), or 10 CFR 52.157(f)(32) and should address only those features and capabilities selected by the applicant for inclusion in the plant design to address aircraft impacts.

The description of the features and capabilities should be equivalent in detail to descriptions of other design features and functional capabilities addressing beyond-design-basis events or severe accidents which are required to be described in the license, certification, or approval application.

Inclusion of any SGI in the information submitted in the FSAR as part of a relevant application must be in accordance with applicable requirements in 10 CFR part 73. The NRC will process and address requests for access to this information from the general public in accordance with the NRC's existing regulations and procedures.

The NRC reiterates that aircraft impact is not a design basis event. Therefore, the design and construction of features and capabilities designated by the designer as meeting the aircraft impact rule's requirements need not meet the "special treatment" requirements applicable to safety-related and important to safety structures, systems, and components.

Paragraph (c) Control of changes.

Paragraph (c) clarifies the requirements governing changes to information in the PSAR or FSAR which reflects the results of compliance with the aircraft impact rule for each of the licensing or certification processes subject to the aircraft impact rule. In the proposed aircraft impact rule, the provisions governing changes to such information were in proposed 10 CFR 52.502.

The PSAR or FSAR information required by the aircraft impact rule which is subject to the change control requirement in paragraph (c) are the descriptions of the design features and functional capabilities incorporated into the final design of the nuclear power facility and the description of how the identified design features and functional capabilities meet the assessment requirements in 10 CFR 50.150(a)(1). Not all of the actual change controls are presented in paragraph (c). Instead, most of the sections in paragraph (c) cite to an existing regulation presenting the FSAR change controls for that type of license or certification. Thus, in many cases, paragraph (c) is simply a "pointer" to the already-existing change controls. However, in all cases, the objective of the change controls remains the same: to determine whether the design of the facility, as changed or modified, is shown to withstand the effects of the aircraft impact with reduced use of operator actions. In other words, the applicant or licensee must continue to show, with the modified design, that the acceptance criteria in 10 CFR 50.150(a)(1)

are met with reduced use of operator actions. The rule does not require an applicant or a licensee implementing a design change to redo the complete aircraft impact assessment to evaluate the effects of the change. The NRC believes it may be possible to demonstrate that a design change is bounded by the original design or that the change provides an equivalent level of protection, without redoing the original assessment.

Paragraph (c)(1) provides that, for construction permits which are subject to the aircraft impact rule, if the permit holder changes the information required by 10 CFR 50.34(a)(13) to be included in the PSAR, then the permit holder shall consider the effect of the changed feature or capability on the original assessment required by 10 CFR 50.150(a) and amend the information required by 10 CFR 50.34(a)(13) to be included in PSAR to describe how the modified design features and functional capabilities continue to meet the assessment requirements in 10 CFR 50.150(a)(1).

Paragraph (c)(2) provides that, for operating licenses which are subject to the aircraft impact rule (i.e., operating licenses for which the underlying construction permits are issued after **[INSERT EFFECTIVE DATE OF FINAL RULE]**), if the licensee changes the information required by 10 CFR 50.34(b)(12) to be included in the FSAR, then the licensee shall consider the effect of the changed feature or capability on the original assessment required by 10 CFR 50.150(a) and amend the information required by 10 CFR 50.34(b)(12) to be included in the FSAR to describe how the modified design features and functional capabilities continue to meet the assessment requirements in 10 CFR 50.150(a)(1).

Paragraph (c)(3) provides that, for design certifications which are subject to the aircraft impact rule, generic changes to the information required by 10 CFR 52.47(a)(28) to be included in the FSAR are governed by the applicable requirements of 10 CFR 52.63. A design feature or functional capability described in a standard design certification may not be changed in the design certification except by notice and comment rulemaking (see 10 CFR 52.63(a)(1) and (2)), and such a change must meet one of the criteria in 10 CFR 52.63(a)(1). Any generic change to

a design certification rule must be implemented by all referencing combined licenses, as required by 10 CFR 52.63(a)(3).

Paragraph (c)(4)(i) provides that, for combined licenses which are subject to 10 CFR 50.150(a) (i.e., combined licenses that do not reference a design certification, design approval, or manufactured reactor that complies with the rule), if the licensee changes the information required by 10 CFR 52.79(a)(47) to be included in the FSAR, then the licensee shall consider the effect of the changed feature or capability on the original assessment required by 10 CFR 50.150 and amend the information required by 10 CFR 52.79(a)(47) to be included in the FSAR to describe how the modified design features and functional capabilities continue to meet the assessment requirements in 10 CFR 50.150(a)(1). The NRC believes that, because this rule addresses a beyond-design-basis event, it is appropriate to apply the same standard that was applied during the original assessment of design features and functional capabilities to any licensee-proposed changes to such features and capabilities.

Paragraph (c)(4)(ii) provides that, for combined license applicants or holders which are not subject to 10 CFR 50.150(a), but reference a standard design certification which is subject to 10 CFR 50.150(a), proposed departures from the information required by 10 CFR 52.47(a)(28) to be included in the FSAR for the referenced standard design certification are governed by the change control requirements in the applicable design certification rule. The NRC expects to add a new change control provision to future design certification rules subject to 10 CFR 50.150(a) (including amendments to any of the four existing design certifications) to govern combined license applicants and holders referencing the design certification that request a departure from the design features or functional capabilities in the referenced design certification. The new change control provision will require that, if the applicant or licensee changes the information required by 10 CFR 52.47(a)(28) to be included in the FSAR for the standard design certification, then the applicant or licensee shall consider the effect of the changed feature or capability on the original assessment required by 10 CFR 50.150(a). The applicant or licensee

must also describe in a change to the FSAR (i.e., a plant-specific departure from the generic design control document), how the modified design features and functional capabilities continue to meet the assessment requirements in 10 CFR 50.150(a)(1).

Paragraph (c)(4)(iii) provides that, for combined license applicants or holders which are not subject to 10 CFR 50.150(a) but reference a manufactured reactor which is subject to 10 CFR 50.150(a), proposed departures from the information required by 10 CFR 52.157(f)(32) to be included in the FSAR for the manufacturing license are governed by the applicable requirements in 10 CFR 52.171(b)(2). Paragraph (b)(2) of 10 CFR 52.171 allows an applicant or licensee who references or uses a nuclear power reactor manufactured under a manufacturing license under this subpart to request a departure from the design characteristics, site parameters, terms and conditions, or approved design of the manufactured reactor. The Commission may grant a request only if it determines that the departure will comply with the requirements of 10 CFR 52.7 and that the special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the departure.

Paragraph (c)(5)(i) provides that, for manufacturing licenses which are subject to 10 CFR 50.150(a), generic changes to the information required by 10 CFR 52.157(f)(32) to be included in the FSAR are governed by the applicable requirements of 10 CFR 52.171. Paragraph (b)(1) of 10 CFR 52.171 does not allow the holder of a manufacturing license to make changes to the design of the nuclear power reactor authorized to be manufactured without prior Commission approval. Any request for a change to the design must be in the form of an application for a license amendment, and must meet the requirements of 10 CFR 50.90 and 10 CFR 50.92.

Paragraph (c)(5)(ii) provides that, for manufacturing license applicants or holders which are subject to 10 CFR 50.150(a), proposed departures from the information required by 10 CFR 52.47(a)(28) to be included in the FSAR for the referenced standard design certification are governed by the change control requirements in the applicable design certification rule.

Section 52.47 Contents of applications; technical information.

Section 52.47 identifies the required technical information to be included in an application for a standard design certification. The final rule revises this section by adding a new paragraph (a)(28) requiring that the FSAR contain the information required by 10 CFR 50.150, "Aircraft impact assessment." This information, as contained in paragraph (b) of 10 CFR 50.150, is:

1. A description of the design features and functional capabilities identified in 10 CFR 50.150(a)(1); and
2. A description of how such design features and functional capabilities meet the assessment requirements in 10 CFR 50.150(a)(1).

The 10 CFR 52.47(a)(28) requirement applies only to those standard design certification applications which are subject to 10 CFR 50.150, that is, those design certifications issued after the effective date of the final rule (see 10 CFR 50.150(a)). Thus, any standard design certification application that is docketed and under review by the NRC but has not yet been issued in final form as of the effective date of 10 CFR 50.150 must amend its application to include the information required by 10 CFR 50.150.

Section 52.59 Criteria for renewal.

Section 52.59 establishes the criteria which must be met in order for the NRC to renew a standard design certification. The final rule revises paragraph (a) by adding a requirement that the Commission shall, the first time one of the four existing design certifications is to be renewed, find that the renewed design complies with the applicable requirements of the aircraft impact rule if the design certification has not already been amended to comply with the aircraft impact rule. This finding would be in addition to the (implicit) findings which the Commission must make under paragraph (a). The findings need only be made the first time the design certification is renewed. Once the design certification has been amended or renewed to reflect compliance with the aircraft impact rule, there is no need for the NRC to remake the finding of compliance with the aircraft impact rule nor does the design or the assessment have to be

upgraded for purposes of aircraft impact rule compliance in any subsequent amendment or renewal.

Section 52.79 Contents of applications; technical information in final safety analysis report.

Section 52.79 identifies the required technical information to be included in an FSAR submitted in a combined license application under 10 CFR part 52, subpart C, Combined Licenses. The final rule revises this section by adding a new paragraph (a)(47) requiring that the FSAR contain the information required by 10 CFR 50.150. This is the same type of information that an applicant for a standard design certification will need to submit, namely, the following:

1. A description of the design features and functional capabilities identified in 10 CFR 50.150(a)(1); and
2. A description of how such design features and functional capabilities meet the assessment requirements in 10 CFR 50.150(a)(1).

Only those combined licenses issued after the effective date of the final rule that do not reference a standard design certification, standard design approval, or manufactured reactor, or that reference a standard design certification issued before the effective date of the final rule which has not been amended to address the requirements of 10 CFR 50.150, are subject to 10 CFR 52.79(a)(47). Thus, a combined license application filed after the effective date of 10 CFR 50.150 and referencing a standard design certification, standard design approval, or manufactured reactor subject to the proposed rule, or referencing one of the four current standard design certifications (ABWR, System 80+, AP600, and AP1000) which has been amended to address the requirements of 10 CFR 50.150 will not have to separately include the information required by 10 CFR 50.150 because it will be incorporated by reference to the standard design or manufactured reactor. This is consistent with the requirements of 10 CFR 52.79(c), (d), and (e) which state that, if the combined license application references a standard design certification, standard design approval, or manufactured reactor, then the FSAR need not

contain information or analyses submitted to the Commission in connection with the design certification, design approval, or manufacturing license, as applicable. By contrast, a combined license applicant not referencing a standard design certification, standard design approval, or manufactured reactor whose application is docketed and under review by the NRC but for which a license has not yet been issued as of the effective date of 10 CFR 50.150, must amend its application to include the information required by 10 CFR 50.150.

Section 52.137 Contents of applications; technical information.

Section 52.137 identifies the required technical information to be included in an application for a standard design approval. The final rule revises this section by adding a new paragraph (a)(26) requiring that the FSAR contain the information required by 10 CFR 50.150. This information, as currently presented in paragraph (b) of 10 CFR 50.150 is:

1. A description of the design features and functional capabilities identified in 10 CFR 50.150(a)(1); and
2. A description of how such design features and functional capabilities meet the assessment requirements in 10 CFR 50.150(a)(1).

The 10 CFR 52.137(a)(26) requirement applies only to those standard design approval applications which are subject to 10 CFR 50.150, that is, those design approvals issued after the effective date of the final rule (see 10 CFR 50.150(a)). Thus, any standard design approval application that is docketed and under review by the NRC but has not yet been issued in final form as of the effective date of 10 CFR 50.150 must amend its application to include the information required by final 10 CFR 50.150.

Section 52.157 Contents of applications; technical information in final safety analysis report.

Section 52.157 identifies the required technical information to be included in an application for a manufacturing license. The final rule revises this section by adding a new paragraph (f)(32) requiring that the FSAR contain the information required by 10 CFR 50.150.

This information, as currently presented in paragraph (b) of 10 CFR 50.150, is limited to the following:

1. A description of the design features and functional capabilities identified in 10 CFR 50.150(a)(1); and
2. A description of how such design features and functional capabilities meet the assessment requirements in 10 CFR 50.150(a)(1).

The 10 CFR 52.157(f)(32) requirement applies only to those manufacturing license applications which are subject to 10 CFR 50.150(a)(1), that is, those manufacturing licenses that do not reference a design certification or design approval complying with 10 CFR 50.150. Thus, any manufacturing license application that is docketed and under review by the NRC but has not yet been issued in final form as of the effective date of 10 CFR 50.150 must amend its application to include the information required by 10 CFR 50.150.

### **VIII. Guidance**

The NRC staff expects to issue new regulatory guidance on the requirements in 10 CFR 50.150 that will endorse guidance being prepared by NEI. This guidance is intended to provide an acceptable method by which relevant applicants can perform the assessment of aircraft impacts to meet the requirements of 10 CFR 50.150. The final rule requires that the design-specific impact assessment use the aircraft impact characteristics specified in the rule. A more detailed description of the aircraft impact parameters that are considered appropriate for use in the assessment will be presented in the NRC's regulatory guidance. Any future changes to the detailed parameters on aircraft impact characteristics set forth in the guidance will be approved by the Commission. Because the portion of this regulatory guidance describing the detailed aircraft impact characteristics is likely to contain SGI, that portion of the document will only be made available to those individuals with a need-to-know, and who are otherwise qualified to have access to SGI. A version of the document without the SGI will be made publicly

available. Publication of the draft regulatory guidance is planned to coincide with publication of the final rule.

### IX. Availability of Documents

The NRC is making the following documents available to interested persons through one or more of the following methods as indicated.

*Public Document Room (PDR).* The NRC PDR is located at 11555 Rockville Pike, Public File Area O1 F21, Rockville, Maryland 20852, e-mail [pdr.resource@nrc.gov](mailto:pdr.resource@nrc.gov).

*Regulations.gov (Web).* These documents may be viewed and downloaded electronically through the Federal e-Rulemaking Portal <http://www.regulations.gov>, Docket number NRC-2007-0009.

*NRC's Electronic Reading Room (ERR).* The NRC's public electronic reading room is located at [www.nrc.gov/reading-rm.html](http://www.nrc.gov/reading-rm.html).

Document	PDR	Web	ERR (ADAMS)
SECY-06-0204, "Proposed Rulemaking—Security Assessment Requirements for New Nuclear Power Reactor Designs (RIN 3150-AH92)" (September 28, 2006)	X	X	ML062300068
Staff Requirements Memorandum for SECY-06-0204 (April 24, 2007)	X	X	ML071140119
Regulatory History Index for the October 3, 2007 proposed rule	X	X	ML073511644
Federal Register Notice	X	X	ML090220527
Environmental Assessment	X	X	ML090610123
Response to Public Comments	X	X	ML090610124
SECY-08-0152, "Final Rule—Consideration of Aircraft Impacts for New Nuclear Power Reactors (RIN 3150-AI19)" (October 15, 2008)	X	X	ML082670873
Staff Requirements Memorandum for SECY-08-0152 (February 17, 2009)	X	X	ML090480610

## **X. Agreement State Compatibility**

Under the “Policy Statement on Adequacy and Compatibility of Agreement States Programs,” approved by the Commission on June 20, 1997, and published in the *Federal Register* (62 FR 46517; September 3, 1997), this rule is classified as compatibility “NRC.” Compatibility is not required for Category “NRC” regulations. The NRC program elements in this category are those that relate directly to areas of regulation reserved to the NRC by the Atomic Energy Act or the provisions of 10 CFR. Although an Agreement State may not adopt program elements reserved to the NRC, it may wish to inform its licensees of certain requirements via a mechanism that is consistent with the particular State’s administrative procedure laws. Category “NRC” regulations do not confer regulatory authority on the State.

## **XI. Voluntary Consensus Standards**

The National Technology Transfer and Advancement Act of 1995, Pub. L. 104-113, requires that Federal agencies use technical standards that are developed or adopted by voluntary consensus standards bodies unless using such a standard is inconsistent with applicable law or is otherwise impractical. In this final rule, the NRC is amending 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. The applicant is required to use realistic analyses to identify and incorporate design features and functional capabilities to show, with reduced use of operator actions, that either the reactor core remains cooled or the containment remains intact, and either spent fuel cooling or spent fuel pool integrity is maintained. These requirements apply to applicants for new construction permits; new operating licenses that reference a new construction permit; new standard design certifications, renewal of any of the four existing design certifications if the design has not previously been amended to comply with the final rule; new standard design approvals; manufacturing licenses that do not reference a

standard design certification or standard design approval, or that reference a standard design certification issued before the effective date of the rule which has not been amended to comply with the rule; and combined licenses that do not reference a standard design certification, standard design approval, or manufactured reactor, or that reference a standard design certification issued before the effective date of the rule which has not been amended to comply with the rule. In addition, these amendments contain requirements for control of changes to any design features or functional capabilities credited for showing that the facility can withstand the effects of an aircraft impact. This regulatory action does not establish standards with which all applicants must comply. For these reasons, the Commission concludes that this action does not constitute the establishment of a standard that contains generally applicable requirements.

## **XII. Finding of No Significant Environmental Impact: Availability**

The Commission has determined under the National Environmental Policy Act of 1969, as amended, and the Commission's regulations in subpart A to 10 CFR part 51, that this rule is not a major Federal action significantly affecting the quality of the human environment and, therefore, an environmental impact statement (EIS) is not required. As presented in the final environmental assessment, this action will not have a significant environmental impact because it applies only to applicants for new nuclear power reactors and requires them to use realistic analyses to identify and incorporate design features and functional capabilities to show, with reduced use of operator actions, that either the reactor core remains cooled or the containment remains intact, and either spent fuel cooling or spent fuel pool integrity is maintained, and because the standards and requirements applicable to radiological releases and effluents are not affected by this rulemaking.

The NRC requested public comments on any aspect of the environmental assessment. Three public comments were received that discussed the need for the preparation of an EIS for

the aircraft impact rulemaking. The NRC responded that because the adoption of this rule does not constitute a major Federal action significantly affecting the environment, an EIS was not prepared for this rulemaking. The NRC also requested the views of the States on the environmental assessment for this rule. No State comments were received. Availability of the final environmental assessment is provided in Section IX of this document.

### **XIII. Paperwork Reduction Act Statement**

The final rule contains new or amended information collection requirements contained in 10 CFR parts 50 and 52 that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). These requirements were approved by the Office of Management and Budget, approval numbers 3150-0011 and 3150-0151.

The burden to the public for these information collections is estimated to average 2,186.7 hours per response. This includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments on any aspect of these information collections, including suggestions for reducing the burden, to the Records and FOIA/Privacy Services Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet electronic mail to [INFOCOLLECTS.Resource@nrc.gov](mailto:INFOCOLLECTS.Resource@nrc.gov); and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0011), Office of Management and Budget, Washington, DC 20503.

#### **Public Protection Notification**

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

#### **XIV. Regulatory Analysis**

The NRC has prepared a regulatory analysis on this final rule and has included it in this *Federal Register* document. The analysis examines the costs and benefits of the alternatives considered by the NRC. No public comments were received on the proposed regulatory analysis.

##### **1. Statement of the Problem and Objective.**

This final rule amends 10 CFR part 50 and 10 CFR part 52 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. The applicant is required to use realistic analyses to identify and incorporate design features and functional capabilities to show, with reduced use of operator actions, that either the reactor core remains cooled or the containment remains intact, and either spent fuel cooling or spent fuel pool integrity is maintained. These requirements apply to applicants for new construction permits; new operating licenses that reference a new construction permit; new standard design certifications; renewal of any of the four existing design certifications if the design has not previously been amended to comply with the final rule; new standard design approvals; manufacturing licenses that do not reference a standard design certification or standard design approval, or that reference a standard design certification issued before the effective date of the rule which has not been amended to comply with the rule; and combined licenses that don't reference a standard design certification, standard design approval, or manufactured reactor, or that reference a standard design certification issued before the effective date of the rule which has not been amended to comply with the rule. In addition, these amendments contain requirements for control of changes to any design features or functional capabilities credited for showing that the facility can withstand the effects of an aircraft impact. The objective of this rule is to require nuclear power plant designers to perform a rigorous assessment of the design to identify design features and functional capabilities that

could provide additional inherent protection to show, with reduced use of operator actions, that either the reactor core remains cooled or the containment remains intact, and either spent fuel cooling or spent fuel pool integrity is maintained.

## 2. Identification of Regulatory Alternatives.

The only alternative considered was to conduct a rulemaking to require applicants to perform an aircraft impact assessment on new nuclear power reactors because the Commission directed the NRC staff in a staff requirements memorandum dated April 24, 2007, to revise the regulations. However, the NRC considers the no-action alternative as the baseline from which to measure the costs and benefits of the final rule.

The regulations in 10 CFR part 50 and 10 CFR part 52 are being amended for applicants for new nuclear power reactors to require these applicants to perform a design-specific assessment of the effects of the impact of a large, commercial aircraft. Applicants for new nuclear power reactors are required to use realistic analyses to identify and incorporate design features and functional capabilities to show, with reduced use of operator actions, that either the reactor core remains cooled or the containment remains intact, and either spent fuel cooling or spent fuel pool integrity is maintained. This rule should result in new nuclear power reactor facilities being more inherently robust with regard to an aircraft impact than if they were designed in the absence of this final rule.

## 3. Analysis of Values and Impacts of Final Rulemaking.

### 3.1 Identification of Affected Attributes.

The NRC identified the attributes that the regulatory action could affect by using the list of potential attributes provided in Chapter 5 of NUREG/BR-0184, "Regulatory Analysis Technical Evaluation Handbook," issued January 1997. Affected attributes include the following:

*Public Health (Accident).* The regulatory action will reduce the risk that public health will be affected by the release of radioactive materials to the environment from the impact of a large, commercial aircraft on a nuclear power plant.

*Occupational Health (Accident).* The regulatory action will reduce the risk that occupational health will be affected by the release of radioactive materials to the environment from the impact of a large, commercial aircraft on a nuclear power plant.

*Offsite Property.* The regulatory action will reduce the risk that offsite property will be affected by the release of radioactive materials to the environment from the impact of a large, commercial aircraft on a nuclear power plant.

*Onsite Property.* The regulatory action will reduce the risk that onsite property will be affected by the release of radioactive materials to the environment from the impact of a large, commercial aircraft on a nuclear power plant.

*Industry Implementation.* The regulatory action will require applicants for new nuclear power reactors to perform a design-specific assessment of the effects of the impact of a large, commercial aircraft. Applicants for new nuclear power reactors are required to use realistic analyses to identify and incorporate design features and functional capabilities to show, with reduced use of operator actions, that either the reactor core remains cooled or the containment remains intact, and either spent fuel cooling or spent fuel pool integrity is maintained. Applicants will incur costs to develop an SGI program, perform the assessment, and incorporate the results into the design.

*Industry Operation.* The regulatory action will require applicants and licensees for new nuclear power reactors to retain the aircraft impact assessment throughout the pendency of the application and for the term of the certification or license (including any period of renewal). Applicants and licensees will incur costs to retain the assessment and supporting documentation.

*NRC Implementation.* Under the regulatory action, the NRC will incur costs to develop guidance on performing an aircraft impact assessment and to review the actions taken by the applicant to comply with the aircraft impact rule.

*Improvements in Knowledge.* The regulatory action will improve knowledge with regard to an aircraft impact by ensuring that nuclear power plant designers perform a rigorous assessment of the design to identify design features and functional capabilities that could provide additional inherent protection to withstand the effects of an aircraft impact.

*Safeguards and Security Considerations.* The regulatory action to address the capability of new nuclear power reactors relative to an aircraft impact is based both on enhanced public health and safety and enhanced common defense and security, but is not necessary for adequate protection. Rather, this rule's goal is to enhance the facility's inherent robustness at the design stage.

### 3.2 Methodology.

This section describes the process used to evaluate benefits and costs associated with the regulatory action. The benefits (values) come from any desirable changes in the affected attributes which are solely qualitative for the regulatory action; the costs (impacts or burdens) come from any undesirable changes in the affected attributes (e.g., monetary costs, increased exposures). As described in Section 3.1 of this regulatory analysis, the attributes expected to be affected include public health (accident), occupational health (accident), offsite property, onsite property, industry implementation, industry operation, NRC implementation, improvements in knowledge, and safeguards and security considerations.

When possible, a cost-benefit analysis quantifies the overall costs and benefits of the regulatory options relative to each of these attributes. This analysis relies on a qualitative evaluation of several of the affected attributes (public health, occupational health, offsite property, onsite property, improvements in knowledge, and safeguards and security

considerations) because of the difficulty in quantifying the impact of this rulemaking. The regulatory action will affect these attributes through the associated reduction in the risks of aircraft impact damage to the plant resulting in the inability to maintain either reactor core cooling or an intact containment, and either spent fuel cooling or spent fuel pool integrity.

The remaining attributes (industry implementation, industry operation, and NRC implementation) are evaluated quantitatively. Quantitative analysis requires a characterization of the universe, including factors such as the number of applicants and the scope of the aircraft impact assessment being performed. The NRC analyzed incremental costs and benefits of the regulatory action relative to the baseline (i.e., the no-action alternative described in Section 2 of this regulatory analysis).

Under OMB guidance and NUREG/BR-0058, Revision 4, "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission," issued September 2004, the results of the cost analysis are presented as discounted flows of funds using 3- and 7-percent real discount rates.

### 3.3 Data.

The NRC derived information from industry announcements on the estimated number of applications submitted for a new standard design certification, renewal of an existing design certification, and a combined license that references a currently approved standard design certification. Data used was obtained during September 2008. The NRC staff applied its professional judgment in this analysis given the uncertainty in the number of applications for a new construction permit; new operating license; new standard design approval; manufacturing license that does not reference a standard design certification or standard design approval, or that references a standard design certification issued before the effective date of the rule which has not been amended to comply with the rule; and combined license that does not reference a standard design certification, standard design approval, or manufactured reactor, or that

references a standard design certification issued before the effective date of the rule which has not been amended to comply with the rule.

#### 3.4 Assumptions.

The regulatory action will apply only to applicants for new construction permits; new operating licenses that reference a new construction permit; new standard design certifications, renewal of any of the four existing design certifications if the design has not previously been amended to comply with the final rule; new standard design approvals; manufacturing licenses that don't reference a standard design certification or standard design approval, or that reference a standard design certification issued before the effective date of the rule which has not been amended to comply with the rule; and combined licenses that don't reference a standard design certification, standard design approval, or manufactured reactor, or that reference a standard design certification issued before the effective date of the rule which has not been amended to comply with the rule. It will not apply to a construction permit, operating license, standard design approval, or standard design certification (except at renewal) issued before the effective date of the final rule.

#### 3.5 Analysis.

For Sections 3.5.1 through 3.5.10, the cost-benefit analysis of the regulatory action is based on the assumed number of applicants in each category. In each case, industry will incur both implementation and operation costs. Furthermore, because all of the benefits are measured qualitatively in this analysis, only costs are included in these subsections.

This analysis uses \$100 and \$105 per hour for NRC and industry staff rates, respectively. In the analysis done for the proposed rule, an NRC hourly staff rate of \$105 was used. This value was recently revised to account for the changing composition of the NRC staff and re-baselining of estimates of hours for training, annual leave, etc. In addition, the NRC has

reassessed the cost to purchase an appropriate SGI container and lock. This analysis uses \$1,200, rather than the \$2,500 used for the proposed rule analysis.

The annual results are derived as present values using the 3- and 7-percent discount rates as described in Appendix B to NUREG/BR-0184.

### 3.5.1 Construction Permit Applications.

Under the regulatory action, an applicant for a new construction permit will need to comply with the requirements for an aircraft impact assessment in 10 CFR 50.150. However, the NRC staff concludes that it is unlikely that a request for a new construction permit will be submitted to the NRC for approval during the next 20 years. Therefore, no cost-benefit analysis is needed for a construction permit.

### 3.5.2 Operating License Applications.

Under the regulatory action, an applicant for a new operating license will need to comply with the requirements for an aircraft impact assessment in 10 CFR 50.150. However, the NRC staff concludes that it is unlikely that a request for a new operating license will be submitted to the NRC for approval during the next 20 years. Therefore, no cost-benefit analysis is needed for an operating license.

### 3.5.3 Standard Design Certification Applications.

In implementing the regulatory action, standard design certification applicants will incur one-time costs to develop an SGI program; purchase an appropriate SGI storage container and lock; perform the aircraft impact assessment; and identify and incorporate into the design those design features and functional capabilities that show, with reduced use of operator action, that the facility can withstand the effects of an aircraft impact. The NRC estimates that each applicant will spend 120 hours to develop the SGI program. Using the assumed staff rate of \$105 per hour, the one-time cost of developing the SGI program will be \$13,000 per applicant (120 hours x \$105/hour). The NRC also estimates it will cost \$1,200 to purchase an appropriate

SGL storage container and lock. Finally, the NRC estimates it will take an applicant 24 staff-months for a one-time cost of \$400,000 (24 staff-months x 4 weeks/month x 40 hours/week x \$105/hour) per application to complete the assessment and incorporate the results into the design. Thus, the one-time cost for an applicant to implement the regulatory action is estimated to be \$415,000.

For the standard design certification process, this analysis assumes that three applications will be affected by the final rule in the year that the rule is promulgated (i.e., year 0), and thereafter, one application will be submitted every 4 years at years 4, 8, 12, 16, and 20. Table 1 shows the discounted flow of funds (using 3- and 7-percent discount rates) of the total industry implementation costs for standard design certification applications over a 20-year period.

With respect to industry operational costs, there will be recordkeeping costs for retention of the assessment and supporting documentation. The NRC will require standard design certification applicants to retain these records throughout the pendency of the application and for the term of the certification (including any period of renewal). For this analysis, it is assumed that it takes 4 years for the Commission to adopt the application as a final standard design certification rule, after which the records are retained by the applicant for 15 years as required by the standard design certification rule. No renewal of the standard design certification rule is considered for this analysis. Thus, the records are retained for a total of 19 years. In addition, it is assumed that an applicant spends 3 hours per year to maintain the records. The estimated annual cost for recordkeeping is \$315 per applicant (3 hours x \$105/hour). Table 2 shows the discounted flow of funds of the recordkeeping costs (using 3- and 7-percent discount rates) for applications submitted over a 20-year period, using the schedule discussed previously.

After a standard design certification is adopted by the NRC, any change to a design feature or functional capability credited for complying with the aircraft impact rule will require that

the applicant or licensee consider the effect of the changed feature or capability on the original assessment. The applicant or licensee must amend the information included in the FSAR to describe how the modified design feature or functional capability continues to meet the assessment requirements in the aircraft impact rule. However, the NRC staff concludes that after a standard design certification is adopted, it is unlikely that any changes will be made to design features or functional capabilities credited for complying with the aircraft impact rule. Therefore, no industry cost analysis is needed for this portion of the regulatory action.

Under the final rule, any combined license applicant referencing a design certification that complies with the requirements of this final rule will not have to perform an aircraft impact assessment.

Table 1. Summary of Industry Implementation Costs for Standard Design Certification Applicants			
		Implementation Costs	
Year	Number of Standard Design Certification Applications	Using 7-Percent Discount Rate (\$1,000)	Using 3-Percent Discount Rate (\$1,000)
0	3	1,200	1,200
4	1	320	370
8	1	240	330
12	1	180	290
16	1	140	260
20	1	110	230
TOTAL	8	2,190	2,680

Table 2. Summary of Industry Operating Costs for Standard Design Certification Applicants			
Year*	Number of Standard Design Certification Applications	Operating Costs	
		Using 7-Percent Discount Rate (\$1,000)	Using 3-Percent Discount Rate (\$1,000)
0	3	9.8	14
4	1	2.5	4
8	1	1.9	3.6
12	1	1.4	3.2
16	1	1.1	2.8
20	1	0.84	2.5
TOTAL	8	17.54	30.1

\* Analysis assumes that it takes 4 years for the Commission to adopt the application as a final standard design certification rule, after which the records are retained by the applicant for 15 years.

#### 3.5.4 Applications for Renewal of Any of the Four Existing Design Certifications if the Design has Not Previously Been Amended to Comply with the Final Rule.

Under the regulatory action, an applicant for renewal of any of the four existing design certifications which has not previously been amended to comply with the final aircraft impact rule will need to comply with the requirements of an aircraft assessment in 10 CFR 50.150. The NRC is expecting one application for renewal of one of the four existing design certifications that will be required to comply with the final rule to be submitted in the year after the rule is promulgated (i.e., year 1).

This analysis assumes that the applicant for renewal has an existing SGI program and an appropriate SGI storage container and lock; resulting in no related costs to implement the regulatory action. However, in implementing the regulatory action, the applicant will incur one-time costs to perform the aircraft impact assessment and identify and incorporate into the design those design features and functional capabilities to show, with reduced use of operator action,

that the facility can withstand the effects of an aircraft impact. The NRC estimates it will take this applicant 24 staff-months for a one-time cost of \$400,000 (24 staff-months x 4 weeks/month x 40 hours/week x \$105/hour) to complete the assessment and incorporate the results into the design. No other costs associated with the application are considered for this analysis (i.e., overall costs to do the administrative work to prepare and submit other portions of the application). Thus the one-time cost for this applicant to implement the regulatory action is estimated to be \$400,000. For one application submitted in the year after the rule is promulgated, the discounted flow of funds of the implementation costs are \$390,000 and \$370,000 using 3- and 7- percent discount rates respectively.

With respect to industry operational costs, there will be recordkeeping costs for retention of the assessment and supporting documentation. The NRC will require applicants for renewal of an existing design certification to retain these records throughout the pendency of the application and for the term of the certification. For this analysis, it is assumed that it takes 3 years for the Commission to adopt the application for renewal as a final design certification rule, after which the records are retained by the applicant for 15 years as will be required by the standard design certification rule. No subsequent renewal of the standard design certification rule is considered for this analysis. Thus, the records are retained for a total of 18 years. In addition, it is assumed that an applicant spends 3 hours per year to maintain the records. The estimated annual cost for recordkeeping is \$315 per applicant (3 hours x \$105/hour). Thus, the discounted flow of funds of the recordkeeping costs for one application is \$4,200 and \$3,000 using 3- and 7- percent discount rates respectively.

After a renewal of an existing design certification is adopted by the NRC, any change to a design feature or functional capability credited for complying with the aircraft impact rule will require that the applicant or licensee consider the effect of the changed feature or capability on the original assessment. The applicant must describe how the modified design feature or

functional capability continues to meet the assessment requirements in the aircraft impact rule. However, the NRC staff concludes that after the renewal is adopted, it is unlikely that any changes will be made to design features or functional capabilities credited for complying with the aircraft impact rule. Therefore, no industry cost analysis is needed for this portion of the regulatory action.

The total industry cost is the sum of the implementation and operation costs. The implementation cost is the present value of the assumed one application (\$400,000) which when discounted is \$390,000 (using a 3-percent discount rate) and \$370,000 (using a 7-percent discount rate). The operating costs are \$4,200 and \$3,000 using the 3- and 7-percent discount rates as shown above. Therefore, the total discounted industry costs are \$394,200 and \$373,200 using 3- and 7-percent discount rates, respectively.

#### 3.5.5 Standard Design Approval Applications.

Under the regulatory action, an applicant for a new standard design approval will need to comply with the requirements for an aircraft impact assessment in 10 CFR 50.150. However, the NRC staff concludes that it is unlikely that a request for a new standard design will be submitted to the NRC for approval during the next 20 years. Therefore, no cost-benefit analysis is needed for a standard design approval.

#### 3.5.6 Combined License Applications Not Referencing a Standard Design Certification, Standard Design Approval, or Manufactured Reactor.

Although the NRC concludes that there is a low probability of a combined license applicant not referencing a standard design certification, standard design approval, or manufactured reactor, this analysis assumes that one application will be submitted to the NRC in year 10 following promulgation of the rule.

In implementing the regulatory action, combined license applicants will incur one-time costs to develop an SGI program; purchase an appropriate SGI storage container and lock;

perform the aircraft impact assessment; and identify and incorporate into the design those design features and functional capabilities to show, with reduced use of operator action, that the facility can withstand the effects of an aircraft impact. The NRC estimates that each applicant will spend 120 hours to develop the SGI program. Assuming a staff rate of \$105 per hour, the one-time cost of developing the SGI program will be \$13,000 per applicant (120 hours x \$105/hour). The NRC also estimates it will cost \$1,200 to purchase an appropriate SGI storage container and lock. Finally, the NRC estimates it will take an applicant 24 staff-months for a one-time cost of \$400,000 (24 staff-months x 4 weeks/month x 40 hours/week x \$105/hour) per application to complete the assessment and incorporate the results into the design. Thus, the one-time cost for an applicant to implement the regulatory action is estimated to be \$415,000. For one application submitted in year 10, following promulgation of the rule, the discounted flow of funds of the implementation costs are \$310,000 and \$210,000 using 3- and 7-percent discount rates, respectively.

With respect to industry operational costs, there will be recordkeeping costs for retention of the assessment and supporting documentation. The NRC will require that these records be retained throughout the pendency of the application and for the term of the license (including any period of renewal). For this analysis, it is assumed that it takes 4 years for the Commission to approve the application, after which the records are retained by the licensee for 60 years (initial 40-year license period plus a 20-year renewal period), at which time the Commission terminates the facility license. The records are retained for a total of 64 years. In addition, it is assumed that an applicant spends 3 hours per year to maintain the records. The estimated annual cost for recordkeeping is \$315 per applicant (3 hours x \$105/hour). Thus, the discounted flow of funds of the recordkeeping costs for one application is \$6,000 and \$2,200 using 3- and 7-percent discount rates, respectively.

After a combined license application is approved by the NRC, any change to a design feature or functional capability credited for complying with the aircraft impact rule will require that the licensee consider the effect of the changed feature or capability on the original assessment. The applicant must describe how the modified design feature or functional capability continues to meet the assessment requirements in the aircraft impact rule. However, the NRC staff concludes that after a combined license is issued, it is unlikely that a licensee will make any changes to design features or functional capabilities credited at the application stage. Therefore, no industry cost analysis is needed for this portion of the regulatory action.

The total industry cost is the sum of the implementation and operation costs. The implementation cost is the present value of the assumed one application (\$415,000) which when discounted is \$310,000 (using a 3-percent discount rate) and \$210,000 (using a 7-percent discount rate). The operating costs are \$6,000 and \$2,200 using the 3- and 7-percent discount rates as shown above. Therefore, the total discounted industry costs are \$316,000 and \$212,200 using 3- and 7-percent discount rates, respectively.

### 3.5.7 Combined License Applications Referencing a Standard Design Certification Issued Before the Effective Date of the Rule Which Has Not Been Amended to Comply with the Rule.

Under the regulatory action, an applicant for a combined license that references one of the four currently approved design certifications must comply with the rule. At present, the NRC is aware of only two of the currently approved designs that are planned to be referenced in combined license applications. For one of these certified designs, the AP1000, the original applicant has voluntarily submitted to the NRC an amendment that it believes will comply with the requirements of the aircraft impact rule. If the NRC approves the amendment as meeting the aircraft impact rule, then any combined license applicants referencing the recertified design will not be required to perform an aircraft impact assessment. Furthermore, this analysis assumes that after the combined license application is approved, the licensee makes no changes to a

design feature or functional capability credited by the design certification for complying with the aircraft impact rule. Therefore, no cost-benefit analysis is needed for combined license applications that reference the recertified AP1000 design.

Regarding the other currently approved design certification that is being referenced in at least one combined license application, the NRC is not aware of any plans by the original applicant to submit an application to amend the certification to comply with the requirements of the aircraft impact rule, prior to the renewal of the certification. The NRC has received one combined license application referencing this certified design, and it is expected that this final rule will be effective before the NRC makes a decision on the combined license application. Therefore, the combined license applicant will be required to amend their application to comply with the requirements of the aircraft impact rule if the referenced design certification is not amended to comply with the rule during the pendency of the combined license application.

In implementing the regulatory action, the NRC is assuming that the combined license applicant will submit an amendment to their application to comply with the aircraft impact rule. In doing so, this combined license applicant will incur one-time costs to develop an SGI program; purchase an appropriate SGI storage container and lock; perform the aircraft impact assessment; and identify and incorporate into the design those design features and functional capabilities to show, with reduced use of operator action, that the facility can withstand the effects of an aircraft impact. The NRC estimates that this applicant will spend 120 hours to develop the SGI program. Assuming a staff rate of \$105 per hour, the one-time cost of developing the SGI program will be \$13,000 (120 hours x \$105/hour). The NRC also estimates it will cost \$1,200 to purchase an appropriate SGI storage container and lock. Finally, the NRC estimates it will take this applicant 24 staff-months for a one-time cost of \$400,000 (24 staff-months x 4 weeks/month x 40 hours/week x \$105/hour) to complete the assessment and incorporate the results into the design. Thus, the one-time cost for this applicant to

implement the regulatory action is estimated to be \$415,000. This analysis assumes that the application will be affected by the final rule in the year that the rule is promulgated (i.e., year 0), and therefore, the discounted flow of funds of the implementation costs is \$415,000 using either 3- or 7-percent discount rates.

With respect to industry operational costs, there will be recordkeeping costs for retention of the assessment and supporting documentation. The NRC will require that these records be retained throughout the pendency of the application and for the term of the license (including any period of renewal). For this analysis, it is assumed that it takes 4 years for the Commission to approve the application, after which the records are retained by the licensee for 60 years (initial 40-year license period plus a 20-year renewal period), at which time the Commission terminates the facility license. The records are retained for a total of 64 years. In addition, it is assumed that an applicant spends 3 hours per year to maintain the records. The estimated annual cost for recordkeeping is \$315 per applicant (3 hours x \$105/hour). Thus, the discounted flow of funds of the recordkeeping costs for one application is \$8,100 and \$4,300 using 3- and 7-percent discount rates, respectively.

After a combined license application is approved by the NRC, any change to a design feature or functional capability credited for complying with the aircraft impact rule will require that the licensee consider the effect of the changed feature or capability on the original assessment. The applicant must describe how the modified design feature or functional capability continues to meet the assessment requirements in the aircraft impact rule. However, the NRC concludes that after a combined license is approved, it is unlikely that a licensee will make any changes to design features or functional capabilities credited in the design at the application stage. Therefore, no industry cost analysis is needed for this portion of the regulatory action.

The total industry cost is the sum of the implementation and operation costs. The implementation cost is the present value of the assumed one application (\$415,000) which when

discounted is \$415,000 (using either 3-or 7-percent discount rates). The operating costs are \$8,100 and \$4,300 using the 3- and 7-percent discount rates as shown above. Therefore, the total discounted industry costs are \$423,100 and \$419,300 using 3- and 7-percent discount rates, respectively.

### 3.5.8 Manufacturing License Applications Not Referencing a Standard Design Certification or Standard Design Approval.

Although the NRC concludes that there is a low probability of a manufacturing license application not referencing a standard design certification or standard design approval, this analysis assumes that one application will be submitted to the NRC in year 10 following promulgation of the rule.

In implementing the regulatory action, manufacturing license applicants will incur one-time costs to develop an SGI program; purchase an appropriate SGI storage container and lock; perform the aircraft impact assessment; and identify and incorporate into the design those design features and functional capabilities to show, with reduced use of operator action, that the facility can withstand the effects of an aircraft impact. The NRC estimates that each applicant will spend 120 hours to develop the SGI program. Assuming a staff rate of \$105 per hour, the one-time cost of developing the SGI program will be \$13,000 per applicant (120 hours x \$105/hour). The NRC also estimates it will cost \$1,200 to purchase an appropriate SGI storage container and lock. Finally, the NRC estimates it will take an applicant 24 staff-months for a one-time cost of \$400,000 (24 staff-months x 4 weeks/month x 40 hours/week x \$105/hour) per application to complete the assessment and incorporate the results into the design. Thus, the one-time cost for an applicant to implement the regulatory action is estimated to be \$415,000. For one application submitted in year 10, following promulgation of the rule, the discounted flow of funds of the implementation costs are \$310,000 and \$210,000 using 3- and 7-percent discount rates, respectively.

With respect to industry operational costs, there will be recordkeeping costs for retention of the assessment and supporting documentation. The NRC will require that these records be retained throughout the pendency of the application and for the term of the license (including any period of renewal). For this analysis, it is assumed that it takes 4 years for the Commission to approve the application, after which the records are retained by the licensee for 15 years, at which time the Commission terminates the facility license. The records are retained for a total of 19 years. In addition, it is assumed that an applicant spends 3 hours per year to maintain the records. The estimated annual cost for recordkeeping is \$315 per applicant (3 hours x \$105/hour). Thus, the discounted flow of funds of the recordkeeping costs for one application is \$3,400 and \$1,700 using 3- and 7-percent discount rates, respectively.

After a manufacturing license application is approved by the NRC, any change to a design feature or functional capability credited for avoiding or mitigating the effects of an aircraft impact will require that the licensee consider the effect of the changed feature or capability on the original assessment. The applicant must describe how the modified design feature or functional capability continues to meet the assessment requirements in the aircraft impact rule. However, the NRC staff concludes that after a manufacturing license is approved, it is unlikely that a licensee will make any changes to design features or functional capabilities credited in the design at the application stage. Therefore, no industry cost analysis is needed for this portion of the regulatory action.

The total industry cost is the sum of the implementation and operation costs. The implementation cost is the present value of the assumed one application (\$415,000) which when discounted is \$310,000 (using a 3-percent discount rate) and \$210,000 (using a 7-percent discount rate). The operating costs are \$3,400 and \$1,700 using the 3- and 7-percent discount rates as shown previously. Therefore, the total discounted industry costs are \$313,400 and \$211,700 using 3- and 7-percent discount rates, respectively.

### 3.5.9 Manufacturing License Applications Referencing a Standard Design Certification Issued Before the Effective Date of the Rule Which has Not Been Amended to Comply with the Rule.

Under the regulatory action, an applicant for a manufacturing license who references one of the four currently approved design certifications will need to comply with the requirements for an aircraft impact assessment in 10 CFR 50.150. However, the NRC staff concludes that it is unlikely that a request for a manufacturing license referencing one of these four design certifications will be submitted to the NRC for approval during the next 20 years. Therefore, no cost-benefit analysis is needed for this type of manufacturing license application.

### 3.5.10 NRC Implementation.

*Cost to Review the Applicant's Results.* The NRC will incur costs to review the actions taken by the applicant to comply with the aircraft impact rule. The one time cost for NRC verification of compliance with the rule, consisting of reviewing the information submitted by each applicant and onsite inspection of the assessment, is estimated to be \$125,000 (7.8 staff-months x 4 weeks/month x 40 hours/week x \$100/hour). As an example, the total NRC cost in the year that the rule is promulgated (i.e., year 0), is the present value of the costs to review the actions taken and assessments for three applications for a standard design certification. The NRC staff estimates the cost to be \$375,000 for the three applications. Table 3 shows the discounted flow of funds (using 3- and 7-percent discount rates) of the NRC implementation costs over 20 years to review the applications for a standard design certification; renewal of an existing standard design certification; combined license that does not reference a standard design certification, standard design approval, or manufactured reactor; combined license that references a standard design certification issued before the effective date of the rule which has not been amended to comply with the rule; and manufacturing license that does not reference a standard design certification.

*Cost to Renew an Existing Design Certification.* The costs to the NRC to conduct a rulemaking to adopt the renewal of an existing design certification are not included in this analysis because they are not an impact of this rule.

*Cost to Develop Guidance.* The NRC assumes that it will take about 3.0 full-time staff years to develop guidance to support implementation of the regulatory action. The cost to develop guidance is estimated to be \$500,000.

*Cost to Provide Training.* The NRC will incur costs to develop a training course to instruct NRC staff on the changes to 10 CFR parts 50 and 52. Assuming that it will take 20 staff-hours to develop the training course, the cost is estimated to be \$2,000 (20 staff-hours x \$100/hour). The cost to train 20 people for 2 hours, plus the instructor's time of 2 hours is estimated to be \$4,200 (21 people x 2 hours x \$100/hour). The total cost to the NRC to provide training for the regulatory action is estimated to be \$6,000.

Table 3 shows the discounted flow of funds of the total NRC implementation costs for the regulatory action over 20 years.

Table 3. Summary of NRC Implementation Costs				
Year	Application		Implementation Costs	
	Number Reviewed	Category*	Using 7-Percent Discount Rate (\$1,000)	Using 3-Percent Discount Rate (\$1,000)
0	3	DC	375	375
0	1	COL	125	125
1	1	DC (renewal)	115	120
4	1	DC	95	110
8	1	DC	75	100
10	1	COL	65	95
10	1	ML	65	95
12	1	DC	55	90
16	1	DC	40	80
20	1	DC	30	70
Cost to Review All Applications			1,040	1,260
Cost to Develop Guidance			500	500
Cost to Provide Training			6	6
TOTAL (rounded)			1,500	1,800

\* DC = design certification. COL = combined license application. ML = manufacturing license application.

### 3.5.11 Impacts to Other Stakeholders.

The NRC staff has not identified any impacts to other stakeholders or the Agreement States. However, the action is expected to lead to an increase in public confidence because nuclear power plant designers will perform a rigorous assessment of design features and functional capabilities that could provide additional inherent protection to withstand the effects of an aircraft impact.

### 3.5.12 Qualitative Benefits of the Action.

The benefits of the final rule can be evaluated only on a qualitative basis. The analysis estimates that the action will result in qualitative benefits in public health (accidental), occupational health (accidental), offsite property, onsite property, improvements in knowledge, and safeguards and security considerations.

Specifically, the benefits will include improvements in knowledge because applicants for new nuclear power reactors will need to perform a design-specific assessment of the effects of the impact of a large, commercial aircraft. If the effects of an aircraft impact are not assessed by nuclear power plant designers at the design stage, it will be more difficult at a later time to enhance the facility's inherent robustness to show that it can withstand the effects of an aircraft impact. Furthermore, applicants will need to use realistic analyses to identify and incorporate design features and functional capabilities to show, with reduced use of operator actions, that either the reactor core remains cooled or the containment remains intact, and either spent fuel cooling or spent fuel pool integrity is maintained. In this manner, this rule should result in new nuclear power reactor facilities being more inherently robust with regard to an aircraft impact than if they were designed in the absence of this rule.

In addition, because the impact of a large, commercial aircraft is a beyond-design-basis event, this rule provides an enhanced level of protection beyond that which is provided by the existing adequate protection requirements, which all operating power reactors are required to meet.

4. Presentation of Results.

Table 4 summarizes the results of the cost analysis for industry.

Table 4. Summary of Total Industry Costs for Action		
Category of Application*	Using 7-Percent Discount Rate (\$1,000)	Using 3-Percent Discount Rate (\$1,000)
	Implementation Costs	
DC	2,190	2,680
DC (renewal)	370	390
COL	625	725
ML	210	310
	Operating Costs	
DC	17.54	30.1
DC (renewal)	3.0	4.2
COL	6.5	14.1
ML	1.7	3.4
<b>TOTAL (rounded)</b>	<b>3,400</b>	<b>4,200</b>

\* DC = design certification. COL = combined license application. ML = manufacturing license application.

Table 5 shows the total costs of the regulatory action.

Table 5. Summary of Industry and NRC Costs		
	Using 7-Percent Discount Rate (\$1,000)	Using 3-Percent Discount Rate (\$1,000)
Industry	3,400	4,200
NRC	1,500	1,800
<b>TOTAL (rounded)</b>	<b>4,900</b>	<b>6,000</b>

## 5. Decision Rationale.

The total present-valued costs of this action are \$6.0 million and \$4.9 million for 3- and 7-percent discount rates, respectively. The benefits are expressed only qualitatively and are discussed in Section 3.5.11 of this regulatory analysis. As noted previously, the key benefit is improvement in knowledge because the final rule requires applicants for new nuclear power reactors to perform a design-specific assessment of the effects of the impact of a large, commercial aircraft. The applicant is required to use realistic analyses to identify and incorporate design features and functional capabilities to show, with reduced use of operator actions, that either the reactor core remains cooled or the containment remains intact, and either spent fuel cooling or spent fuel pool integrity is maintained.

## 6. Implementation Schedule.

The final rule will become effective 30 days after publication in the *Federal Register*.

## **XV. Regulatory Flexibility Act Certification**

In accordance with the Regulatory Flexibility Act (5 U.S.C. 605(b)), the Commission certifies that this rule will not have a significant economic impact on a substantial number of small entities. This final rule affects only the licensing of nuclear power plants. The companies that will apply for an approval, certification, permit, or license in accordance with the regulations affected by this rule do not fall within the scope of the definition of "small entities" set forth in the Regulatory Flexibility Act or the size standards established by the NRC (10 CFR 2.810).

## **XVI. Backfit Analysis**

The NRC has determined that, except in one respect, the backfit rule, 10 CFR 50.109, and comparable provisions in 10 CFR part 52, do not apply to this final rule and, therefore, a backfit analysis is not required, because the final rule – with one exception – does not contain

any provisions which either impose backfitting as defined in the backfit rule or is otherwise inconsistent with any of the comparable backfitting and finality provisions in part 52. The aircraft impact assessment requirements apply to new construction permits; new operating licenses that reference a new construction permit; new standard design certifications; new standard design approvals; manufacturing licenses that don't reference a standard design certification or standard design approval, or that reference a design certification issued before the effective date of the rule which has not been amended to comply with the rule; and combined licenses that don't reference a standard design certification, standard design approval, or manufactured reactor, or that reference a standard design certification issued before the effective date of the rule which has not been amended to comply with the rule. They also apply to renewal of the four existing design certifications in 10 CFR part 52, appendices A through D, if the design has not previously been amended to comply with the aircraft impact rule. However, combined license applicants referencing one of the four currently approved design certifications must comply with the rule. The backfitting issues for each of these licenses, certifications, and regulatory approvals are discussed below.

Construction permits and operating licenses.

The aircraft impact rule applies to construction permits issued after **[INSERT EFFECTIVE DATE OF FINAL RULE]**, the effective date of the rule. To the extent that the aircraft impact rule revises the requirements for future construction permits, the requirements do not constitute backfitting, because the requirements in the final aircraft impact rule are prospective in nature and effect. The backfit rule was not intended to apply to every NRC action which substantially changes the expectations of future applicants under 10 CFR part 50. The final rule also does not apply to current holders of construction permits. Hence, there is no backfitting of current holders of construction permits. The final aircraft impact rule also does not apply to applicants for operating licenses whose underlying construction permits are issued

before **[INSERT EFFECTIVE DATE OF FINAL RULE]**. Inasmuch as the aircraft impact rule is not imposed as a requirement on operating license applicants whose underlying construction permits were issued before **[INSERT EFFECTIVE DATE OF FINAL RULE]**, there is no backfitting associated with such existing operating licenses. However, future applicants for operating licenses whose underlying construction permits were also issued after **[INSERT EFFECTIVE DATE OF FINAL RULE]** are required to comply with the aircraft impact rule. To the extent that the rule revises the requirements for future operating license applicants whose construction permits are issued after **[INSERT EFFECTIVE DATE OF FINAL RULE]**, the requirements do not constitute backfitting, because the requirements in the final aircraft impact rule are prospective in nature and effect. The backfit rule was not intended to apply to every NRC action which substantially changes the expectations of future applicants under 10 CFR part 50.

New design certifications and new design approvals.

The aircraft impact rule applies to new standard design certifications and new standard design approvals. To the extent that the aircraft impact rule revises the requirements for future design certifications and design approvals issued after **[INSERT EFFECTIVE DATE OF FINAL RULE]**, the requirements do not constitute backfitting, because the requirements in the aircraft impact rule are prospective in nature and effect. The backfit rule was not intended to apply to every NRC action which substantially changes the expectations of future applicants under 10 CFR part 52.

Four currently-approved design certifications.

The aircraft impact rule does not directly change any of the four currently approved design certifications in 10 CFR part 52, appendices A through D, because the rule does not require that the aircraft impact assessment be performed for those four design certifications during their current terms, nor does the rule require that they be modified to include any design

features or functional capabilities that meet the criteria in the rule. However, the aircraft impact rule requires a combined license applicant referencing one of the four currently approved design certifications to perform the assessment required by the aircraft impact rule. In addition, the rule requires that if any of the four design certifications are renewed, then the renewed design must meet the requirements of the rule. Both situations raise backfitting concerns, which are addressed separately below.

1. Effect during current term of design certification.

The aircraft impact rule requires a combined license applicant referencing one of the four currently approved design certifications to perform the assessment required by the rule. As such, the aircraft impact rule changes the circumstances under which an applicant for combined license may reference one of the four currently approved design certifications. In addition, by requiring the combined license applicant to perform the assessment, and describe plant design features and functional capabilities that are within the scope of the certified design, the aircraft impact rule may be viewed as effectively constituting a change to the design certification. Each of the four currently approved design certification rules contains several provisions generally addressing the referencing of the design certification. None of these provisions require a referencing combined license applicant to, in effect, modify the referenced design to address aircraft impacts. Moreover, Section VI, "Issue Resolution," of each currently approved design certification states that the NRC's safety finding on the design "includes the finding that additional or alternative structures, systems, components, design features,...acceptance criteria, or justifications are not necessary...." In light of these provisions, the NRC believes that the final aircraft impact rule requirements effectively constitute a change to these design certifications, and the applicable criteria of Section VI of each design certification rule and 10 CFR 52.63(a)(1) must be met by the aircraft impact rule.

However, the NRC does not believe that these criteria can be satisfied. Accordingly, the Commission has decided to administratively exempt the aircraft impact rule from these finality and issue resolution provisions in 10 CFR part 52. The Commission's decision is grounded on the following considerations. First, the Commission believes that performance of the assessment required by the rule and incorporation of design features and functional capabilities identified by the assessment constitutes a substantial increase in overall protection of public health and safety and common defense and security of the design and operation of a nuclear power plant constructed in accordance with the referenced design certification, and that direct and indirect implementation costs of compliance with the aircraft impact rule are justified in view of the increased safety and security. Performing the assessment itself provides a substantial safety benefit in reducing licensee and regulatory uncertainty regarding the capability (and vulnerability) of the design to the impact of a large, commercial aircraft. Although it is difficult to quantify the safety enhancement gained through implementation of the aircraft impact rule, the NRC nevertheless believes that the cost of performing the assessment and incorporating the results into the design, as outlined in Section XIV, "Regulatory Analysis," of the Supplementary Information of this document, is justified in view of the increased safety provided by implementation of the aircraft impact rule.

Second, all of the four currently approved certified designs contain one or more advanced reactor attributes described in the Commission's "Policy Statement on Regulation of Advanced Reactors," (73 FR 60612; October 14, 2008). These attributes include the use of highly reliable and less complex shutdown and decay heat removal systems, longer time constants and sufficient instrumentation to allow for more diagnosis and management before reaching safety system challenge and/or exposure of vital equipment to adverse conditions, and designs that minimize the potential for severe accidents and their consequences by providing sufficient inherent safety, reliability, redundancy, diversity and independence in safety systems.

Incorporation of design features and functional capabilities identified as part of the assessment required by the aircraft impact rule will serve to further enhance the availability, capability and effectiveness of those advanced reactor attributes included in each of the currently approved certified designs.

It also appears that a broad range of stakeholders supported the overarching concept that all newly-constructed nuclear power plants should be required to meet the aircraft impact rule. All of the commenters representing non-governmental organizations unaffiliated with the nuclear industry supported the application of the aircraft impact rule to all newly-constructed reactors—including those referencing currently approved design certifications—and to all of the currently approved design certifications regardless of whether they have been referenced in a combined license application. NEI—the industry organization representing, in part, the companies who are most likely to be combined license applicants and, therefore, most likely to be adversely affected by a NRC decision to impose the aircraft impact rule on such applicants—supported the extension of the aircraft impact rule to all future combined license applicants. The original applicants for three of the four existing design certifications supported application of the aircraft impact rule to combined license applications referencing one of the four currently approved designs. The NRC is aware that Westinghouse Electric Company, LLC, which was the original applicant for the AP1000 design certification, is seeking an amendment to the design certification to address the (anticipated final) aircraft impact rule. The NRC notes that any adverse backfitting impact is limited inasmuch as: (i) no combined license referencing any of the four existing design certifications has been issued, (ii) combined license applications referencing one of the four existing design certifications are still in the early stages of NRC review, and (iii) the detailed aircraft impact parameters were made available to design certification applicants and affected combined license applicants in early 2008.

Finally, the Commission emphasizes that this is a highly exceptional action limited to the specific circumstances of this rulemaking. The Commission has only once before taken action to administratively exempt a rulemaking from applicable backfitting or issue finality provisions, and in that one instance (involving revisions to 10 CFR part 26, fitness for duty requirements) the NRC ultimately withdrew the rulemaking, see SRM on SECY-99-141 (June 24, 1999). Although the Commission cannot, as a categorical matter, rule out the possibility of its taking administrative exemptions in the future, the Commission emphasizes that administrative exemptions will continue to be an extremely rare action to be taken only if regulatory considerations strongly favor taking such administrative exemption.

## 2. Effect at Renewal.

The aircraft impact rule requires that if any of the four design certifications be renewed, then the renewed design meet the requirements of the rule. The NRC evaluated whether 10 CFR 50.150(a)(3)(iii)(B) and the conforming revision to 10 CFR 52.59(a), which implement this requirement governing the renewal of these four design certifications, together represent a violation of the finality protection provided by 10 CFR 52.59(b). The NRC concludes that these requirements do not violate the finality protection accorded by those regulatory provisions. The finality protections accorded by 10 CFR 52.59(b) requirements do not absolutely preclude the NRC from applying new or modified requirements to the design certification at the renewal stage. To impose a new or modified requirement at renewal, the NRC need only find that the requirement is either necessary for adequate protection, necessary for compliance with requirements in effect at the time of initial certification, or provides a substantial increase in protection to public health and safety or common defense and security that justifies the cost of implementing the new requirements.

As part of this rulemaking, the NRC makes the finding that the aircraft impact rule, when imposed upon any one of the four design certifications at the time of renewal, constitutes a

substantial increase in protection to public health and safety. The reasons for the NRC's finding are set forth in the discussion above in "Effect during current term of design certification" and in the overall discussion in this statement of considerations of the reasons underlying the adoption of this rule. Accordingly, the NRC has decided to impose by rule a requirement that each of the four currently approved design certification, if renewed, meet the requirements of the aircraft impact rule if they have not been previously amended to comply with the rule. Inasmuch as the NRC has made a generic finding that the rule constitutes a substantial increase in protection to public health and safety and thereby meets the criteria for design certification renewal in 10 CFR 52.59(b), the NRC does not intend to make an additional finding on the same subject in any renewal proceeding for one of the currently approved design certifications.

#### Combined licenses.

The final aircraft impact rule applies to all combined licenses which do not reference a standard design certification, standard design approval or manufactured reactor. There are no existing combined licenses protected by the backfitting restrictions in 10 CFR 50.109 or the finality provisions in 10 CFR part 52. To the extent that the final rule revises the requirements for future combined licenses, including combined license applications which are currently pending before the NRC, the requirements do not constitute backfitting nor are they otherwise inconsistent with the finality provisions in 10 CFR part 52, because the requirements in the final aircraft impact rule are prospective in nature and effect. Neither the backfit rule nor the finality provisions in 10 CFR part 52 were intended to apply to every NRC action which substantially changes the expectations of future applicants under 10 CFR part 52.

#### Manufacturing licenses.

The final aircraft impact rule applies to all manufacturing licenses which do not reference a standard design certification or standard design approval. There are no existing manufacturing licenses protected by the backfitting restrictions in 10 CFR 50.109 or the finality

provisions in 10 CFR part 52. To the extent that the final rule revises the requirements for future manufacturing licenses, the requirements do not constitute backfitting nor are they otherwise inconsistent with the finality provisions in 10 CFR part 52, because the requirements in the final aircraft impact rule are prospective in nature and effect. Neither the backfit rule nor the finality provisions in 10 CFR part 52 were intended to apply to every NRC action which substantially changes the expectations of future applicants under 10 CFR part 52.

### **XVII. Congressional Review Act**

Under the Congressional Review Act of 1996, the NRC has determined that this action is not a major rule and has verified this determination with the Office of Information and Regulatory Affairs of the Office of Management and Budget.

#### List of Subjects

##### 10 CFR Part 50

Antitrust, Classified information, Criminal penalties, Fire protection, Intergovernmental relations, Nuclear power plants and reactors, Radiation protection, Reactor siting criteria, Reporting and recordkeeping requirements.

##### 10 CFR Part 52

Administrative practice and procedure, Antitrust, Backfitting, Combined license, Early site permit, Emergency planning, Fees, Inspection, Limited work authorization, Nuclear power plants and reactors, Probabilistic risk assessment, Prototype, Reactor siting criteria, Redress of site, Reporting and recordkeeping requirements, Standard design, Standard design certification.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974, as amended; and 5 U.S.C. 552 and 553, the NRC is adopting the following amendments to 10 CFR parts 50 and 52.

## **PART 50 - DOMESTIC LICENSING OF PRODUCTION AND UTILIZATION FACILITIES**

1. The authority citation for part 50 continues to read as follows:

AUTHORITY: Secs. 102, 103, 104, 161, 182, 183, 186, 189, 68 Stat. 936, 937, 938, 948, 953, 954, 955, 956, as amended, sec. 234, 83 Stat. 444, as amended (42 U.S.C. 2132, 2133, 2134, 2135, 2201, 2232, 2233, 2236, 2239, 2282); secs. 201, as amended, 202, 206, 88 Stat. 1242, as amended, 1244, 1246 (42 U.S.C. 5841, 5842, 5846); sec. 1704, 112 Stat. 2750 (44 U.S.C. 3504 note); sec. 651(e), Pub. L. 109-58, 119 Stat. 806-810 (42 U.S.C. 2014, 2021, 2021b, 2111). Section 50.7 also issued under Pub. L. 95-601, sec. 10, 92 Stat. 2951 (42 U.S.C. 5841). Section 50.10 also issued under secs. 101, 185, 68 Stat. 955, as amended (42 U.S.C. 2131, 2235); sec. 102, Pub. L. 91-190, 83 Stat. 853 (42 U.S.C. 4332). Sections 50.13, 50.54(dd), and 50.103 also issued under sec. 108, 68 Stat. 939, as amended (42 U.S.C. 2138).

Sections 50.23, 50.35, 50.55, and 50.56 also issued under sec. 185, 68 Stat. 955 (42 U.S.C. 2235). Sections 50.33a, 50.55a and Appendix Q also issued under sec. 102, Pub. L. 91-190, 83 Stat. 853 (42 U.S.C. 4332). Sections 50.34 and 50.54 also issued under sec. 204, 88 Stat. 1245 (42 U.S.C. 5844). Sections 50.58, 50.91, and 50.92 also issued under Pub. L. 97-415, 96 Stat. 2073 (42 U.S.C. 2239). Section 50.78 also issued under sec. 122, 68 Stat. 939 (42 U.S.C. 2152). Sections 50.80 - 50.81 also issued under sec. 184, 68 Stat. 954, as amended (42 U.S.C. 2234). Appendix F also issued under sec. 187, 68 Stat. 955 (42 U.S.C. 2237).

2. In § 50.8, paragraph (b) is revised to read as follows:

**§ 50.8 Information collection requirements: OMB approval.**

\* \* \* \* \*

(b) The approved information collection requirements contained in this part appear in §§ 50.30, 50.33, 50.34, 50.34a, 50.35, 50.36, 50.36a, 50.36b, 50.44, 50.46, 50.47, 50.48, 50.49, 50.54, 50.55, 50.55a, 50.59, 50.60, 50.61, 50.62, 50.63, 50.64, 50.65, 50.66, 50.68, 50.69, 50.70, 50.71, 50.72, 50.74, 50.75, 50.80, 50.82, 50.90, 50.91, 50.120, 50.150, and appendices A, B, E, G, H, I, J, K, M, N, O, Q, R, and S to this part.

\* \* \* \* \*

3. In § 50.34, paragraphs (a)(13) and (b)(12) are added to read as follows:

**§ 50.34 Contents of applications; technical information.**

(a) \* \* \*

(13) On or after **[INSERT EFFECTIVE DATE OF FINAL RULE]**, stationary power reactor applicants who apply for a construction permit shall submit the information required by 10 CFR 50.150(b) as a part of their preliminary safety analysis report.

(b) \* \* \*

(12) On or after **[INSERT EFFECTIVE DATE OF FINAL RULE]**, stationary power reactor applicants who apply for an operating license which is subject to 10 CFR 50.150(a) shall submit the information required by 10 CFR 50.150(b) as a part of their final safety analysis report.

\* \* \* \* \*

4. A new undesignated center heading is added before § 50.120 to read as follows:

**Additional Standards for Licenses, Certifications, and Regulatory Approvals**

5. A new § 50.150 is added to read as follows:

**§ 50.150 Aircraft impact assessment.**

(a) Assessment requirements.

(1) *Assessment.* Each applicant listed in paragraph (a)(3) shall perform a design-specific assessment of the effects on the facility of the impact of a large, commercial aircraft. Using realistic analyses, the applicant shall identify and incorporate into the design those design features and functional capabilities to show that, with reduced use of operator actions:

(i) the reactor core remains cooled, or the containment remains intact; and

(ii) spent fuel cooling or spent fuel pool integrity is maintained.

(2) *Aircraft impact characteristics*<sup>1</sup>. The assessment must be based on the beyond-design-basis impact of a large, commercial aircraft used for long distance flights in the United States, with aviation fuel loading typically used in such flights, and an impact speed and angle of impact considering the ability of both experienced and inexperienced pilots to control large, commercial aircraft at the low altitude representative of a nuclear power plant's low profile.

(3) *Applicability.* The requirements of paragraphs (a)(1) and (a)(2) of this section apply to applicants for:

(i) Construction permits for nuclear power reactors issued under this part after **[INSERT EFFECTIVE DATE OF FINAL RULE]**;

(ii) Operating licenses for nuclear power reactors issued under this part for which a construction permit was issued after **[INSERT EFFECTIVE DATE OF FINAL RULE]**;

(iii)(A) Standard design certifications issued under part 52 of this chapter after **[INSERT EFFECTIVE DATE OF FINAL RULE]**;

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<sup>1</sup> Changes to the detailed parameters on aircraft impact characteristics set forth in guidance shall be approved by the Commission.

(B) Renewal of standard design certifications in effect on **[INSERT EFFECTIVE DATE OF FINAL RULE]** which have not been amended to comply with the requirements of this section by the time of application for renewal;

(iv) Standard design approvals issued under part 52 of this chapter after **[INSERT EFFECTIVE DATE OF FINAL RULE]**;

(v) Combined licenses issued under part 52 of this chapter that:

(A) Do not reference a standard design certification, standard design approval, or manufactured reactor; or

(B) Reference a standard design certification issued before **[INSERT EFFECTIVE DATE OF FINAL RULE]** which has not been amended to address the requirements of this section; and

(vi) Manufacturing licenses issued under part 52 of this chapter that:

(A) Do not reference a standard design certification or standard design approval; or

(B) Reference a standard design certification issued before **[INSERT EFFECTIVE DATE OF FINAL RULE]** which has not been amended to address the requirements of this section.

(b) *Content of application.* For applicants identified in paragraph (a)(3) of this section, the preliminary or final safety analysis report, as applicable, must include a description of:

(1) The design features and functional capabilities identified in paragraph (a)(1) of this section; and

(2) How the design features and functional capabilities identified in paragraph (a)(1) of this section meet the assessment requirements in paragraph (a)(1) of this section.

(c) *Control of changes.*

(1) For construction permits which are subject to paragraph (a) of this section, if the permit holder changes the information required by 10 CFR 50.34(a)(13) to be included in the preliminary safety analysis report, then the permit holder shall consider the effect of the changed feature or capability on the original assessment required by 10 CFR 50.150(a) and amend the

information required by 10 CFR 50.34(a)(13) to be included in the preliminary safety analysis report to describe how the modified design features and functional capabilities continue to meet the assessment requirements in paragraph (a)(1) of this section.

(2) For operating licenses which are subject to paragraph (a) of this section, if the licensee changes the information required by 10 CFR 50.34(b)(12) to be included in the final safety analysis report, then the licensee shall consider the effect of the changed feature or capability on the original assessment required by 10 CFR 50.150(a) and amend the information required by 10 CFR 50.34(b)(12) to be included in the final safety analysis report to describe how the modified design features and functional capabilities continue to meet the assessment requirements in paragraph (a)(1) of this section.

(3) For standard design certifications which are subject to paragraph (a) of this section, generic changes to the information required by 10 CFR 52.47(a)(28) to be included in the final safety analysis report are governed by the applicable requirements of 10 CFR 52.63.

(4)(i) For combined licenses which are subject to paragraph (a) of this section, if the licensee changes the information required by 10 CFR 52.79(a)(47) to be included in the final safety analysis report, then the licensee shall consider the effect of the changed feature or capability on the original assessment required by 10 CFR 50.150(a) and amend the information required by 10 CFR 52.79(a)(47) to be included in the final safety analysis report to describe how the modified design features and functional capabilities continue to meet the assessment requirements in paragraph (a)(1) of this section.

(ii) For combined licenses which are not subject to paragraph (a) of this section but reference a standard design certification which is subject to paragraph (a) of this section, proposed departures from the information required by 10 CFR 52.47(a)(28) to be included in the final safety analysis report for the referenced standard design certification are governed by the change control requirements in the applicable design certification rule.

(iii) For combined licenses which are not subject to paragraph (a) of this section but reference a manufactured reactor which is subject to paragraph (a) of this section, proposed departures from the information required by 10 CFR 52.157(f)(32) to be included in the final safety analysis report for the manufacturing license are governed by the applicable requirements in 10 CFR 52.171(b)(2).

(5)(i) For manufacturing licenses which are subject to paragraph (a) of this section, generic changes to the information required by 10 CFR 52.157(f)(32) to be included in the final safety analysis report are governed by the applicable requirements of 10 CFR 52.171.

(ii) For manufacturing licenses which are not subject to paragraph (a) of this section but reference a standard design certification which is subject to paragraph (a) of this section, proposed departures from the information required by 10 CFR 52.47(a)(28) to be included in the final safety analysis report for the referenced standard design certification are governed by the change control requirements in the applicable design certification rule.

## **PART 52 - LICENSES, CERTIFICATIONS, AND APPROVALS FOR NUCLEAR POWER PLANTS**

6. The authority citation for part 52 continues to read as follows:

AUTHORITY: Secs. 103, 104, 161, 182, 183, 186, 189, 68 Stat. 936, 948, 953, 954, 955, 956, as amended, sec. 234, 83 Stat. 444, as amended (42 U.S.C. 2133, 2201, 2232, 2233, 2236, 2239, 2282); secs. 201, 202, 206, 88 Stat. 1242, 1244, 1246, as amended (42 U.S.C. 5841, 5842, 5846); sec. 1704, 112 Stat. 2750 (44 U.S.C. 3504 note).

7. In § 52.47, paragraph (a)(28) is added to read as follows:

**§ 52.47 Contents of applications; technical information.**

\* \* \* \* \*

(a) \* \* \*

(28) For applications for standard design certifications which are subject to 10 CFR 50.150(a), the information required by 10 CFR 50.150(b).

\* \* \* \* \*

8. In § 52.59, paragraph (a) is revised to read as follows:

**§ 52.59 Criteria for renewal.**

(a) The Commission shall issue a rule granting the renewal if the design, either as originally certified or as modified during the rulemaking on the renewal, complies with the Atomic Energy Act and the Commission's regulations applicable and in effect at the time the certification was issued, provided, however, that the first time the Commission issues a rule granting the renewal for a standard design certification in effect on **[INSERT EFFECTIVE DATE OF FINAL RULE]**, the Commission shall, in addition, find that the renewed design complies with the applicable requirements of 10 CFR 50.150.

\* \* \* \* \*

9. In § 52.79, paragraph (a)(47) is added to read as follows:

**§ 52.79 Contents of applications; technical information in final safety analysis report.**

(a) \* \* \*

(47) For applications for combined licenses which are subject to 10 CFR 50.150(a), the information required by 10 CFR 50.150(b).

\* \* \* \* \*

10. In § 52.137, paragraph (a)(26) is added to read as follows:

**§ 52.137 Contents of applications; technical information.**

\* \* \* \* \*

(a) \* \* \*

(26) For applications for standard design approvals which are subject to 10 CFR 50.150(a), the information required by 10 CFR 50.150(b).

\* \* \* \* \*

11. In § 52.157, paragraph (f)(32) is added to read as follows:

**§ 52.157 Contents of applications; technical information in final safety analysis report.**

\* \* \* \* \*

(f) \* \* \*

(32) For applications for manufacturing licenses which are subject to 10 CFR 50.150(a), the information required by 10 CFR 50.150(b).

Dated at Rockville, Maryland, this 4<sup>th</sup> day of June 2009.

For the Nuclear Regulatory Commission.

/RA/

Annette L. Vietti-Cook,  
Secretary of the Commission.