RULEMAKING ISSUE
AFFIRMATION

October 15, 2008 SECY-08-0152

FOR: The Commissioners

FROM: R. W. Borchardt
Executive Director for Operations

Karen D. Cyr
General Counsel

SUBJECT: FINAL RULE—CONSIDERATION OF AIRCRAFT IMPACTS FOR NEW NUCLEAR POWER REACTORS (RIN 3150-AI19)

PURPOSE:

The purpose of this paper is to request Commission approval to publish in the *Federal Register* the enclosed final rule, "Consideration of Aircraft Impacts for New Nuclear Power Reactors." This rule amends certain requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," and Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." Specifically, the rule requires applicants for new nuclear power reactors to perform a rigorous assessment of the design to identify design features and functional capabilities that could provide additional inherent protection to avoid or mitigate the effects of an aircraft impact.

CONTACTS: Nanette Gilles, NRO/DNRL
301-415-1180

Stewart Schneider, NRR/DPR
301-415-4123

SUMMARY:

The U.S. Nuclear Regulatory Commission (NRC or the Commission) staff (the staff) is seeking Commission approval of final amendments to 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 would be required to identify and incorporate into the design those design features and functional capabilities that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact on the following key safety functions:

- core cooling capability
- containment integrity
- spent fuel cooling capability
- spent fuel pool integrity

In addition, these amendments contain requirements for control of changes to any design features or functional capabilities credited for avoiding or mitigating the effects of an aircraft impact. These requirements apply to the following:

- applicants for and holders of new construction permits
- applicants for and holders of new operating licenses that reference a new construction permit
- applicants for new standard design certifications
- applicants for new standard design approvals
- applicants for and holders of combined licenses
- applicants for and holders of manufacturing licenses
- the four currently approved design certifications if they are referenced in a combined license

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 rule. The objective of this rule is to require nuclear power plant designers to perform a rigorous assessment of design features and functional capabilities that could provide additional inherent protection to avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of an aircraft impact.

BACKGROUND:

By order dated February 25, 2002, 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 62664; October 26, 2006). During development of the power reactor security final rule, the staff 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). Should these requirements, which are promulgated on the basis of adequate protection of public health and safety and common defense and security, be finalized, all current and future power reactors would be required to comply with them. The current requirements, in conjunction with the currently proposed 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. The staff is recommending also requiring applicants for new nuclear power reactors to incorporate into their design additional practical features that would avoid or mitigate the effects of an aircraft impact.

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 staff in SECY-06-0204, "Proposed Rulemaking—Security Assessment Requirements for New Nuclear Power Reactor Designs (RIN 3150-AH92)," dated September 28, 2006. In its staff requirements memorandum 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 to encourage reactor designers to incorporate practical measures at an early stage in the design process.

As a result of the Commission's staff requirements memorandum, the NRC published a proposed rule 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.

In addition to preparing the proposed rule, the staff also initiated interactions with the Nuclear Steam Supply System vendors who have received or are seeking certification of new designs. Between June and December 2007, these vendors—Westinghouse, GE-Hitachi Nuclear Energy (GEH), Mitsubishi Heavy Industries, Ltd. (MHI), and AREVA Nuclear Power (AREVA)—were all provided the Safeguards-level aircraft impact assessment parameters that the staff considered appropriate for use in performing an assessment as described in the proposed aircraft impact rule. In addition, the staff has briefed Westinghouse, GEH, and AREVA on the results of the staff's aircraft impact assessments for their respective designs. The staff has recently completed its assessment of the MHI Advanced Pressurized Water Reactor and is arranging a briefing for MHI personnel. The staff also briefed South Texas Project Nuclear Operating Company (STPNOC) personnel on the NRC's Advanced Boiling Water Reactor (ABWR) assessment in April 2008 and subsequently provided them with the Safeguards-level aircraft impact parameters because STPNOC indicated their intent to perform an aircraft impact assessment for the ABWR design. STPNOC has submitted an application for a combined license for two ABWRs, the proposed South Texas Project Units 3 and 4. The staff has confirmed that plant designers do not need to receive or generate Secret information to support the aircraft impact assessments. The staff also briefed the Advisory Committee on Reactor Safeguards (ACRS) on the results of the staff's assessments for the ABWR, U.S. Evolutionary

Power Reactor, AP1000, and Economic Simplified Boiling Water Reactor designs on November 1, 2007.

The staff has also been interacting with industry to develop guidance on implementation of the aircraft impact assessment rule. The staff expects to issue new regulatory guidance on the requirements in the aircraft impact assessment rule to endorse guidance being prepared by the Nuclear Energy Institute (NEI). This guidance is intended to provide an acceptable method by which relevant applicants can perform the assessment of aircraft impacts to meet the proposed requirements of 10 CFR 52.500, which are largely unchanged in the staff's final rule. The staff has also had preliminary discussions with the vendors, which are in various stages of performing aircraft impact assessments. Upon finalization of the rule, the staff plans to evaluate the implementation of the rule by the reactor vendors and affected combined license applicants. The staff will also review the associated changes to the design control documents and plant-specific final safety analysis reports as part of the certification and licensing processes.

DISCUSSION:

Public Comments

The public comment period for the proposed rule closed on December 17, 2007. During the public comment period, the NRC held a public meeting to discuss and address questions on the proposed rule. The NRC received 32 comment letters from industry representatives, State agencies, public interest groups, and concerned citizens. 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. No commenters supported the rule exactly as proposed. These comments are summarized in the enclosed *Federal Register* notice and are also discussed in detail in Enclosure 3, "Analysis of Public Comments on Consideration of Aircraft Impacts for New Nuclear Power Reactor Designs, RIN 3150-AI19." Public comments that had a substantive effect on the final rule are addressed in the following paragraphs.

Major Changes Made in the Final Rule

Summaries of the major changes from the proposed rule to the final rule are provided below. All of these changes are discussed in more detail in the *Federal Register* notice.

Assessment Criteria

The NRC requested comments on the desirability of adding an additional acceptance criterion in the final rule beyond the proposed rule's practicability criterion. The proposed rule provided the following 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.

The three industry commenters who addressed this issue opposed the use of 10 CFR Part 100, "Reactor Site Criteria," dose limits as acceptance criteria for the aircraft impact rule. As an alternative, NEI suggested that the NRC adopt functional acceptance criteria that would:

(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. The staff partially adopted NEI's suggestion in the final rule. The final rule requires the assessment to address the effects of the aircraft impact on the key safety functions of core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity. The designer must then determine, as part of the assessment, whether there are practical design features and functional capabilities that avoid or mitigate the effects of the aircraft impact. In performing the practicality evaluation, the staff expects applicants to first consider the effects of the aircraft impact on core cooling capability and spent fuel cooling capability. If core cooling capability can be maintained with the applicant's identified design features and functional capabilities, then no further consideration of practical design features and functional capabilities to maintain containment integrity is necessary. Likewise, if spent fuel cooling capability can be maintained with the applicant's identified design features and functional capabilities, then no further consideration of practical design features and functional capabilities to maintain spent fuel pool integrity is necessary. However, if there are no practical means to maintain core cooling capability, then the applicant must also consider practical design features and functional capabilities to maintain containment integrity. Likewise, if there are no practical means to maintain spent fuel cooling capability, then the applicant must also consider practical design features and functional capabilities to maintain spent fuel pool integrity. The initial aircraft impact assessment, however, must consider the effects of the aircraft impact on all four key safety functions—core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity.

In arriving at the proposed approach, the staff placed importance on the designation of the aircraft impact assessment (AIA) as a beyond design basis event and maintaining the historical treatment of such events. This ensures that the AIA rule is consistent with other Commission decisions including: the decision that implementation of mitigation strategies against large fires and explosions is sufficient to provide adequate protection of public health and safety; and the decision to exclude aircraft impacts from the Design Basis Threat. As stated in the proposed rule, the goal of AIA rule is to ensure that opportunities are not missed to consider and, where practical, address aircraft impacts during the design of new reactors but, ultimately, the assurance of no undue risk to public health and safety is provided by other NRC regulations. This distinction may also be important to achieving other goals, such as expanding the scope of the rule to previously certified designs. In applying the provisions of 10 CFR 52.63(a)(1)(vi) for existing design certifications and amendments thereto, the NRC is required to find that the safety benefits warrant the direct and indirect costs of implementation.

Should the Commission decide to revise the draft final rule to include more specific acceptance criteria, the staff suggests maintaining the historical treatment of beyond design basis events by avoiding phrases such as "provide reasonable assurance" in connection with a design basis standard (e.g. 10 CFR Part 100 guidelines). This could be accomplished by requiring analyses with realistic methods to produce an "expected result," rather than a conservative or bounding analysis typical of design basis event analysis. Alternatively, the Commission could impose acceptance criteria more suitable to beyond-design-basis scenarios (e.g., no loss of core cooling or no loss of intact containment or no large early release of radioactivity). Finally, the Commission could incorporate both of these suggestions, that is, an acceptance criterion calling for a realistic analysis to demonstrate no loss of core cooling or no loss of intact containment.

Class of Applicants to Whom the Rule Applies

A number of public comments addressed the scope of applicants and licensees to which the rule should apply. Some commenters suggested that the rule should not only apply to new, uncertified reactors but also 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 staff made two major changes to the proposed rule's applicability requirements. The first is the requirement making the final rule applicable to 10 CFR Part 50 license applicants in addition to applicants under 10 CFR Part 52. The staff believes it is important to strive for consistency in the technical requirements that are applied to new applicants under 10 CFR Parts 50 and 52. The draft final rule requires both new power reactor construction permit 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 staff is recommending applying the final rule 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. These requirements would not apply to operating license applications with underlying construction permits that 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. Thus, under the staff's proposal, any current or future applicant for an operating license with an underlying construction permit that was issued before the final aircraft impact rule becomes effective would not be required to comply with the aircraft impact rule.

The second major change that the staff is recommending to the applicability requirements in the proposed rule is that the final rule be made applicable to the four existing design certifications in 10 CFR part 52, appendices A through D, but only if they are referenced in a combined license. The staff 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 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. This recommendation stems not only from acknowledgement of the views expressed by a wide range of stakeholders in favor of requiring all future nuclear power plants to meet the requirements of the aircraft impact rule, but also on the staff's assessment that some of the certified designs may not be built in the U.S., thus making compliance with the rule unnecessary for those designs. Thus, the staff recommends that all future nuclear power plants in the U.S. be required to use designs that comply with the aircraft impact rule.

In evaluating this change, the staff 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. The staff 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 staff 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 period of time after issuance of the final aircraft impact rule. The staff 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 staff has determined that the third approach, i.e., requiring the four currently approved design certifications to be amended to comply with the final aircraft impact rule, but only if they are referenced in a combined license, should be adopted as the rulemaking approach. The staff believes that the draft final rule, as applied to the four currently approved design certifications, meets the criteria in 10 CFR 52.63(a)(1)(vi) and (vii) governing changes to design certifications. The NRC believes that performing the assessment required by the rule, and the incorporation of design features and functional capabilities identified by the assessment, would constitute substantial increases in overall protection of public health and safety and that implementation costs are justified in view of the increased safety. 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. The staff also believes that this approach will preserve the level of standardization achieved through certification of these designs, without imposition of undue burdens on any of the original design certification applicants in circumstances where the designs are not likely to be used, as well as leaving to commercial considerations the entity who will actually prosecute the amendment of the design certification to meet the aircraft impact rule. Standardization is thereby enhanced, which is consistent with the Commission's "Policy Statement on Standardization of Nuclear Power Plants" (52 FR 34884; September 15, 1987). Accordingly, the staff has adopted the third approach in the draft final aircraft impact rule.

However, the staff also recommends that if any of the four currently approved design certifications are not referenced in the first 15-year duration of effectiveness under 10 CFR 52.55, then the design should be amended to comply with the aircraft impact rule if it is renewed under the provisions of 10 CFR 52.57 through 10 CFR 52.61. As discussed above, the staff recommends that if one of the four currently approved design certifications is referenced in a combined license application and that design certification has not been amended to comply with the aircraft impact rule, then the NRC should not issue the combined license unless the referenced design certification is amended to comply with the aircraft impact rule. The net effect of this regulatory regime is that if any one of the currently approved design certifications has not been updated at the time of renewal, then there will be no combined licenses that reference that design. Accordingly, there will be no nuclear power plant licensees who would be adversely affected by the mandatory updating requirements of 10 CFR 52.63(a)(3). In this situation, the staff believes that regulatory predictability, efficiency, and public confidence in the regulatory process 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.

Implementation of the staff's recommended approach for the currently approved design certifications will have a practical effect on one of the existing combined license applications: STPNOC's application for a combined license for two ABWRs (proposed South Texas Project

Units 3 and 4). Under the staff's approach in the draft final rule, STPNOC will need to amend its application to reference either:

1. An amendment to the ABWR design certification in 10 CFR Part 52, Appendix A, which reflects compliance with the aircraft impact rule;
2. An application for an amendment to the ABWR approved design certification, where the design is being amended to comply with the aircraft impact rule; or
3. An application for a new design certification (presumably based on the ABWR design certification but updated to comply with the aircraft impact rule) which has been docketed but not granted.

Should the Commission approve the staff's approach in the draft final rule, the staff intends to work with STPNOC to assess the impact of implementation of the final rule on the combined license review schedule.

The NRC requested comments in the proposed rule on whether it should use the same criterion to judge voluntary amendments to an existing design certification as it would use on a new design certification applicant who would be required to comply with the rule. Commenters stated that the NRC should use the same criteria for evaluating amendments to existing design certifications as it would use for evaluating new applications for design certifications. The staff agreed with the commenters that, to ensure consistency among all new reactor designs, the NRC 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.

Relocation of Aircraft Impact Assessment Requirements to 10 CFR Part 50

The NRC requested 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. One industry commenter 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 stated that if the aircraft impact 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. Because the final rule is applicable to applicants under both 10 CFR Part 50 and 10 CFR Part 52, the staff has relocated the aircraft impact assessment requirements that were contained in proposed 10 CFR 52.500 to a new section 10 CFR 50.150 in the final rule. This change is consistent with the 2007 revision to 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. Therefore, the staff has relocated the proposed aircraft impact requirements from proposed 10 CFR 52.500 to 10 CFR 50.150.

Issue Resolution and Regulatory Implementation

Several public comments addressed 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. The final rule reflects that the aircraft

impact assessment will be subject to inspection by the NRC but that the applicant is not required to submit the aircraft impact assessment. The staff 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 Preliminary or Final Safety Analysis Report. Therefore, the adequacy of the impact assessment will not be a matter which may 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." For design certifications, design approvals, and manufacturing licenses 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 rule. Furthermore, the staff has concluded that issue resolution should also extend 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; October 3, 2007). The staff's changed position on this matter stems from a review of the issue resolution provision in design certification rulemakings. 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. (emphasis added)).

There is nothing exceptional about the technical requirements in the aircraft impact rule which suggests that this provision on issue resolution should not apply to matters addressed by the aircraft impact rule. Accordingly, as part of this final rulemaking, the staff proposes that the Commission's position on the scope of issue resolution associated with the aircraft impact rule be conformed to the scope of issue resolution reflected in the currently approved design certifications.

Terminology Changes

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 of the impact of a large, commercial aircraft on the designed facility. 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 aircraft impact. Reference to such an "evaluation" was made throughout the statement of considerations in the proposed rule. However, the staff 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(c)) states that applicants must submit the following:

1. A description of the design features and functional capabilities identified in the assessment; and
2. A description of how the design features and functional capabilities avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact.

The NRC was also concerned that its use of the term “strategies” in the requirement for new reactor applicants to include a description of the design features, functional capabilities, and strategies to avoid or mitigate the effects of the aircraft impact (proposed 10 CFR 52.500(c)) could cause confusion. Neither the proposed rule nor its statement of considerations defined “strategies.” Upon consideration, the staff 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(b)(1) of the final aircraft impact rule that there should be “reduced reliance on operator action.” 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 NRC’s proposed changes to 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 staff’s intent and may not be the optimal time period for consideration of operational matters. For these reasons, the staff is dropping its use of the term strategies in the final rule. Thus, under 10 CFR 50.150(c), 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 staff’s decision to remove the need for the designer to identify design “strategies” does not, however, 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. The staff 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).

The final rule statement of considerations also provides additional guidance on what is meant by the rule's use of the phrases, "to the extent practical" and "with reduced reliance on operator actions." The staff also evaluated whether there would be further merit in providing definitions in the final aircraft impact rule for any of the regulatory terms for which a discussion was provided in the statement of considerations. The staff believes that the explanatory discussion of those regulatory terms in the statement of considerations, and the opportunity to provide further explanation in future regulatory guidance, will suffice to provide clarity and consistency in the application of these terms, and offers some additional flexibility to the NRC as it gains experience with the rule during its implementation. Therefore, the staff decided not to include definitions of any regulatory terms in the final rule language.

COMMITMENT:

The staff will issue regulatory guidance to describe an acceptable method to implement the requirements of this rule and to assist the NRC staff in verifying that such requirements have been met.

RECOMMENDATIONS:

That the Commission:

1. Approve for publication in the *Federal Register* the enclosed notice of final rulemaking (Enclosure 1).
2. Find that imposition of the final aircraft impact rule on the four currently approved design certifications in Appendices A-D of 10 CFR Part 52 meets the criteria in 10 CFR 52.63(a)(1)(vi) and (vii) governing changes to design certifications.
3. Certify that this rule, if promulgated, will not have significant impact on a substantial number of small entities. This certification is included in the enclosed *Federal Register* notice. This will satisfy the requirement of the Regulatory Flexibility Act, 5 U.S.C. 605 (b).
4. Note the following:
    a. That a final regulatory analysis has been prepared for this rulemaking
    b. The staff has determined that this action is not a “major rule,” as defined in the Congressional Review Act of 1996 [5 U.S.C. 804(2)] and has confirmed this determination with the Office of Management and Budget (OMB). The appropriate Congressional and Government Accountability Office contacts will be informed
    c. That a final environmental assessment and finding of no significant impact has been prepared (Enclosure 2)
    d. That the appropriate congressional committees will be informed
    e. That a press release will be issued by the Office of Public Affairs when the NRC files a final rulemaking with the Office of the Federal Register
    f. That the final rule contains amended information collection requirements subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501, et seq.) that must be submitted to the OMB for its review and approval before publication of the final rule in the *Federal Register*.

RESOURCES:

Resources required to complete this rulemaking (including issuance of the regulatory guidance) have been requested in the fiscal year 2009 budget as follows: 1.0 FTE for the Office of New Reactors (NRO), 0.5 FTE for the Office of Nuclear Reactor Regulation (NRR), and 0.4 FTE for the Office of the General Counsel (OGC). No additional resources are necessary to complete this rulemaking.

COORDINATION:

The staff briefed the ACRS on this final rule on July 9, 2008, and received the Committee's recommendation for approval by letter on July 18, 2008 (ADAMS Accession No. ML081930284). OGC has no legal objection to this paper. The Office of the Chief Financial Officer has also reviewed this paper for resource implications and has no objections. This paper has been coordinated with NRO, NRR, the Office of Nuclear Regulatory Research, and the Office of Nuclear Security and Incident Response.

/RA Bruce S. Mallett Acting for/

R. W. Borchardt
Executive Director
for Operations

/RA/

Karen D. Cyr
General Counsel

Enclosures:
1. *Federal Register* Notice
2. Environmental Assessment
3. Analysis of Public Comments

[7590-01-P]

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 identify and incorporate into the design those design features and functional capabilities that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact on core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity. In addition, these amendments contain requirements for control of changes to any design features or functional capabilities credited for avoiding or mitigating the effects of an aircraft impact. These requirements apply to applicants for and holders of new construction permits; applicants for and holders of new operating licenses that reference a new construction permit; applicants for new standard design certifications; applicants for new standard design approvals; applicants for and holders of combined licenses; and applicants for and holders of manufacturing licenses. In addition, the requirements apply to the four existing design certifications in 10 CFR part 52, appendices A through D, but only if they are referenced in a combined license. The final aircraft impact rule, by ensuring that all design certifications referenced in a combined license comply with the aircraft rule, effectively ensures that the design of every combined license complies with the

final rule.

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-2008-0009]. Address questions about NRC dockets to Carol Gallagher 301-415-5905; e-mail 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 O F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland.

NRC's Agencywide Documents Access and Management System (ADAMS): Publicly available documents created or received at the NRC are available electronically at the NRC's electronic Reading Room at http://www.nrc.gov/reading-rm/adams.html. From this page, the public can gain entry into ADAMS, which provides text and image files of NRC's public documents. If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, contact the NRC's PDR reference staff at 1-899-397-4209, 301-415-4737, or by e-mail to pdr.resource@nrc.gov.

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

FOR FURTHER INFORMATION CONTACT: Mr. Stewart Schneider, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington DC 20555-0001; telephone 301-415-4123; e-mail: Stewart.Schneider@nrc.gov or Ms. Nanette Gilles, Office of New Reactors, U.S. Nuclear Regulatory Commission, Washington DC 20555-0001; telephone 301-415-1180; e-mail: Nanette.Gilles@nrc.gov.

SUPPLEMENTARY INFORMATION:

I. Introduction

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. 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[1] designers to perform a rigorous assessment of the design to identify design features and functional capabilities that could provide additional inherent protection to avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of an aircraft impact. 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.

This final rule applies to applicants for and holders of new construction permits; applicants for and holders of new operating licenses that reference a new construction permit;

[1] 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.

applicants for new standard design certifications; applicants for new standard design approvals; applicants for and holders of combined licenses; and applicants for and holders of manufacturing licenses. In addition, the requirements apply to the four existing design certifications in 10 CFR part 52, appendices A through D, but only if they are referenced in a combined license. The final aircraft impact rule, by ensuring that all design certifications referenced in a combined license comply with the aircraft rule, effectively ensures that the design of every combined license complies with the final 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. These applicants are required to perform an assessment of the effects on the designed facility of the impact of a large, commercial aircraft. Applicants must identify and incorporate into the design those practical design features and functional capabilities that avoid or mitigate the effects of an aircraft impact, addressing core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity. Applicants are required to describe how such design features and functional capabilities avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of an aircraft impact. 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). Should the requirements in proposed 10 CFR 50.54(hh), which are promulgated on the basis of adequate protection of public health and safety and common defense and security, be finalized, all current and future power reactors would be required to comply with them.

The current requirements, in conjunction with the currently proposed 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 practical features that would avoid or mitigate 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." 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 that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact on core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity. This aircraft impact rule, along with provisions in the NRC's proposed power reactor security rule, the supplemental

proposed rule amending 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 proposed changes to 10 CFR 50.54(hh). Sufficient target set provisions are included in the NRC's proposed 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 would have to satisfy should that rule become final. 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 proposed revisions to 10 CFR 50.54(hh) to mitigate the effects of large fires and explosions. The proposed 10 CFR 50.54(hh) provisions on mitigating large fires and explosions would 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 that would comply with these proposed 10 CFR 50.54(hh) requirements, and would not require any additional action to comply with these proposed rule

provisions. New applicants for and new holders of operating licenses under 10 CFR part 50 and combined licenses under 10 CFR part 52 would be required to develop and implement procedures that would 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 described in proposed 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 proposed 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 proposed 10 CFR 50.54(hh) is based as being necessary for reasonable assurance of adequate protection.

In contrast to the adequate protection requirements of proposed 10 CFR 50.54(hh), this aircraft impact final rule will enhance safety and security by requiring an assessment of newly designed facilities to avoid or mitigate the effects of aircraft impacts. New nuclear power reactor applicants will be subject to both the requirements of the aircraft impact rule and the proposed 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 the proposed 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 reliance on operator actions. Proposed 10 CFR 50.54(hh) focuses 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 avoid or mitigate 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 and implementation issues, the NRC is expanding the class of applicants that are required to comply with this rule. 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 (proposed 10 CFR 52.500) to submit the information required by 10 CFR 50.150 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 a 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 would be required to comply with the requirements in proposed 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(d) (proposed 10 CFR 52.502) for controlling changes to the information required by 10 CFR 50.150(c) 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(b) 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact.

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, but only if they are referenced in a combined license. This change is discussed in detail in Section III, "Currently Approved Standard Design Certifications and Combined Licenses Referencing These Certifications," 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 of 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(c)) states that applicants must submit a description of the design features and functional capabilities identified in the assessment and a description of how the design features and functional capabilities avoid or mitigate, to the extent practical, the effects of the aircraft impact.

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(b)(1) of the final aircraft impact rule that there should be “reduced reliance on 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 NRC’s proposed changes to 10 CFR 50.54(hh) (73 FR 19443; April 10, 2008) to mitigate the effects of large fires and explosions.[2] 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(c), the relevant applicants need only include in their applications a description of the relevant identified design features and functional capabilities, and need not address

[2] The NRC’s proposed rulemaking on 10 CFR 50.54(hh) would codify the adequate protection requirement imposed on existing operating reactors by ICM Order, Item B.5.b. That proposed rule would require licensees’ Integrated Response Plans to include specific procedures, guidance, and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities using existing or readily available resources that can be effectively implemented under the circumstances associated with loss of large areas of the plant due to explosions or fires. See 73 FR 19443; April 10, 2008.

strategies. The elimination of the term “strategies,” does not, however, relieve applicants from the responsibility to consider reducing reliance on operator actions in performance of the aircraft impact assessment and identification of design features and functional capabilities to comply with this final rule.

The NRC’s decision to remove the need for the designer to identify design “strategies” does not, however, 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).

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 being 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 the proposed 10 CFR 50.54 rulemaking. Under the proposed 10 CFR 50.54 rulemaking, 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 nuclear power plants designed and constructed after **[INSERT EFFECTIVE DATE OF FINAL RULE]** must comply with the final 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 future 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 not only from acknowledgement of the views expressed by a wide range of stakeholders in favor of requiring all future nuclear power plants to meet the requirements of the aircraft impact rule, but also on the NRC's assessment that some of the certified designs may not be built in the U.S., thus making compliance with the rule unnecessary for those designs. Thus, the NRC is requiring that all future 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[3] in Appendices A through D of 10 CFR part 52.[4] The NRC considered

[3] Each of the four currently approved design certifications contain a provision, Section IV, "Additional Requirements and Restrictions," which states that the Commission reserves the right to determine in what manner the DCR may not be referenced by an applicant for a construction permit or operating license under 10 CFR part 50. The addition of this provision was a recognition that, although Part 52 allows applications for construction permits and operating licenses to reference a standard design certification, the NRC has not determined how such referencing would actually be implemented. The NRC expects to add similar provisions to future standard design certification rules, Therefore, the final aircraft impact rule does not provide for the possibility of an application for a construction permit or operating license referencing a standard design certification, including one of the four currently approved design certifications.

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 period of 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 third approach, i.e., requiring the four currently approved design certifications to be amended to comply with the final aircraft impact rule, but only if they are referenced in a combined license, should be adopted as the rulemaking approach. The NRC believes that this approach will preserve the level of standardization achieved through certification of these designs, without imposition of undue burdens on any of the original design certification applicants in circumstances where the designs are not likely to be used, as well as leaving to commercial considerations the entity who will actually prosecute the amendment of the design certification to meet the aircraft impact rule. Standardization is thereby enhanced, which is consistent with the Commission's "Policy Statement on Standardization of Nuclear

[4] The four standard design certifications currently in effect are the U.S. Advanced Boiling Water Reactor (ABWR) design (Appendix A to 10 CFR part 52), the System 80+ design (Appendix B to 10 CFR part 52), the AP600 design (Appendix C to 10 CFR part 52), and the AP1000 design (Appendix D to 10 CFR part 52).

Power Plants" (52 FR 34884;

September 15, 1987). Accordingly, the NRC has adopted the third approach in the final aircraft impact rule.

However, the NRC has also decided that if any of the four currently approved design certifications are not referenced in the first 15-year duration of effectiveness under 10 CFR 52.55, then the design must be amended to comply with the aircraft impact rule if it is renewed under the provisions of 10 CFR 52.57 through 10 CFR 52.61. The NRC's determination in this regard is discussed in IV, "Renewal of an Operating License, Standard Design Certification, Combined License, or Manufacturing License." 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 change in the aircraft impact characteristics required by the Commission to be used in the aircraft impact assessment. As discussed later in Section V.B, "Description of Beyond-Design-Basis Aircraft Impact," of the Supplementary Information, the final rule requires that the design-specific impact assessment use the Commission-specified aircraft impact characteristics as described in 10 CFR 50.150(b). 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 real need to require a reassessment at the design certification renewal stage. In addition, mandating a change to the design at the renewal stages 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 result in licensees who have already designed and constructed their plant (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. As discussed earlier, the NRC has decided that if one of the four currently approved design certifications is referenced in a combined license application and that design certification has not been amended to comply with the aircraft impact rule, then the NRC will not issue the combined license unless the referenced design certification is amended to comply with the aircraft impact rule. The net effect of this regulatory regime is that if any one of the currently approved design certifications has not been updated at the time of renewal, then there will be no combined licenses that reference that design. Accordingly, there will be no nuclear power plant licensees who would be adversely

affected by the mandatory updating requirements of 10 CFR 52.63(a)(3). 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 Rule," of the Supplementary Information for this final rule. The NRC also believes, based upon public comments from some stakeholders urging that the four design certifications be required to comply with the aircraft impact rule, that there would be a significant adverse public perception if the NRC were to renew the design certifications without requiring that the designs be upgraded to comply with the aircraft impact rule. Finally, the NRC does not believe that adopting this rule requirement on the renewal of the four existing design certifications represents any substantial decrease in the commercial interests of the original applicants for these design certifications (or their successors in interests). In accordance with 10 CFR 52.55, the term of the design certification is 15 years, during which the finality and special backfitting restrictions in 10 CFR 52.63 and 52.83 are effective. By contrast, the NRC established less stringent finality requirements in § 52.59(b) which would apply at the time of design certification renewal. The NRC believes that the regulatory regime governing design

certifications clearly established a higher level of finality protection during the 15-year duration of the design certification, and less stringent protection at each instance of design certification renewal. Furthermore, any commercial interest in stability of the design certification because of the possible adverse impact on referencing licenses does not exist if the design certification has not been referenced during its initial duration of effectiveness. In such a circumstance, the NRC's interest in fostering standardization (i.e., by ensuring that all nuclear power plants referencing the design certification use identical design features and functional capabilities to address aircraft impacts) outweighs any possible commercial expectation that the certified design would not have to be changed. For these reasons, 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.

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.
- Identify practical design features and functional capabilities for avoiding or mitigating the effects of the aircraft impact and incorporate them into the design of the facility.
- Describe how such design features and functional capabilities avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact.

This final rule is based on the premise that it is desirable for future power reactors to avoid or mitigate 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, will completely avoid or mitigate 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) 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 practical design features and functional capabilities that either minimize the effects of, or mitigate, 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:

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(b) (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(b). 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 integrity, 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 practical 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 and practical 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(c) (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(c) 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact. 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 practical design features and functional capabilities to avoid or mitigate, with reduced reliance on operator action, the effects of the 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 that avoid or mitigate the effects of the aircraft impact 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, “Inspections,” 10 CFR 50.71, “Maintenance of records, making of reports,” 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 these features and

capabilities avoid or mitigate, to the extent practical and with reduced reliance on operator action, the effects of the 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 discussion above, 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, to identify practical design features or functional capabilities, or to justify non-adoption of practical 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 holder whose application does not reference a design certification, design approval, or manufactured reactor and 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(b) 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.

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(b) (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(b) 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 and evaluation of the practicality of potential features and capabilities for inclusion in the design. The documentation should also include the features and capabilities that were considered but

rejected, along with the basis for their rejection.

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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact. Plant structures critical to maintaining facility safety functions should be designed, if practical, 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 capability, containment integrity, spent fuel cooling capability, 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.

This final rule requires applicants to describe how the design features and functional capabilities avoid or mitigate, "to the extent practical" and with reduced reliance on operator actions, the effects of the aircraft impact. The NRC intends the term "to the extent practical" to

mean including those design features and functional capabilities that are realistically and reasonably feasible from a technical engineering perspective. For example, the NRC believes it may be practical to employ new technologies currently in use in the commercial nuclear power industry or in another industry. Alternatively, it would not be practical to introduce a design feature that could have adverse safety or security consequences under a different operational or accident scenario. This consideration of practicality allows the designers to evaluate potential competing technical factors, such as the response to earthquakes, while at the same time addressing aircraft impacts.

The final rule uses the term "practical" rather than the proposed rule's term "practicable" to describe the design features and functional capabilities that are to be identified for inclusion in the facility design. "Practicable" means "capable of being done," or something that can be put into effect. By contrast, "practical" refers to something that is also sensible and worthwhile. See *Haueser v. Department of Law*, Government of Guam, 97 F.3d 1152, 1160, fn.4 (9th Cir. 1996). The NRC intends that designers include in their designs only those design features and functional capabilities that are reasonable, efficient and workable (see *Random House College Dictionary*, Revised Edition (1980), distinguishing between “practicable” and “practical”).

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 the practicality of 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 avoiding or mitigating 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 avoid or mitigate the effects of an aircraft impact will be controlled only by requirements in 10 CFR 50.150(d) (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 avoiding or mitigating the effects of an aircraft impact will be governed by the requirements in a new paragraph (d), “Control of changes,” of 10 CFR 50.150. For construction permits which are subject to 10 CFR 50.150, paragraph (d)(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(b) 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact. 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 (d)(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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact.

Paragraph (d)(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, *per se*, 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 would 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(b)(1)(i) (i.e., a licensee whose application does not reference a standard design certification, standard design approval, or manufactured reactor), 10 CFR 50.150(d)(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(b) 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the

aircraft impact.

Paragraph (d)(4)(ii) of 10 CFR 50.150 governs combined license applicants or holders which are subject to 10 CFR 50.150(b)(1)(ii) 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(b). 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact. 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 the proposed 10 CFR 50.54(hh).

Paragraph (d)(4)(iii) of 10 CFR 50.150 governs combined license applicants or holders

which are not subject to 10 CFR 50.150(b) but reference a manufactured reactor which is subject to 10 CFR 50.150(b). 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(b) are addressed in 10 CFR 50.150(d)(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 (d)(5)(ii) of 10 CFR 50.150 governs manufacturing license applicants or holders which are subject to 10 CFR 50.150(b)(1)(ii). 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(d) 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. ML080290007.

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 be included. In a separate comment, NEI expressed its view that the submittal on aircraft impacts would be classified as a safeguards information document. A detailed discussion of the commenters' responses is provided at ADAMS Accession No. ML080290007.

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(c) does require that a description of the design features and functional capabilities credited by the applicant to avoid

or mitigate 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact. 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, in part, with the commenters' recommendations for alternative acceptance criteria. The NRC agrees that 10 CFR part 100 dose limits should not be used for the purpose of this rule, and that the concepts of maintaining core cooling, containment integrity, spent fuel cooling and spent fuel pool integrity must be addressed in the assessment; however, the NRC does not view the maintenance of these functions as hard and fast acceptance criteria.

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. Therefore, the acceptance criterion contained in the final rule by which the NRC may judge the required assessment continues to be the practicality criterion addressed in 10 CFR 50.150(b) and (c), that is, that the applicant must describe how the design features and functional capabilities avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact. In addition, the NRC is making it clearer in the final rule that the assessment must address the effects of the aircraft impact on the key safety functions of core cooling capability, containment integrity, spent fuel cooling

capability, and spent fuel pool integrity.

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 this document. 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 this document. 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 COLs that reference a design certification that has not been amended to address the aircraft impact rule.

The NRC notes that, in a change in position from that described in the proposed aircraft impact rule, the NRC has determined in the final aircraft impact rule that the four currently approved standard design certifications in Appendices A through D to 10 CFR Part 52 should be required to comply with the final aircraft impact rule, but only if one of those design certifications is referenced in a combined license, or upon renewal if, at the time of renewal, the design certification has not been amended to comply with the aircraft impact rule. The reasons for this change in position are set forth in Section III, "Currently Approved Standard Design Certifications and Combined Licenses Referencing These Certifications," of the Supplementary Information of this document.

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 a 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 would be required to comply with the requirements in proposed 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(d). 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 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 proposed 10 CFR 50.53(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 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 including the four currently approved design certifications, but only if they are referenced in a combined license application.

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 not provide explicit acceptance criteria to judge the results of the assessment, but does provide additional clarification on the intent of the terms "avoid," "to the extent practical," and "reduced reliance on 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(c) 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.

Section 50.150 *Aircraft impact assessment*

Section 50.150 is a new requirement for assessing a large, commercial aircraft impact at nuclear power plants and incorporating design features and functional capabilities to avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of such aircraft impacts.

Paragraph (a) identifies the types of licenses, certifications, and regulatory approvals for

which applicants or holders must comply with this section's requirements. The aircraft impact rule was designated as 10 CFR 52.500 at the proposed rule stage, but has been redesignated as 10 CFR 50.150, consistent with the NRC's intention that this technical requirement applies to applicants for licenses under 10 CFR part 50 as well as applicants for licenses and regulatory approvals under 10 CFR part 52.

The aircraft impact rule applies to, and must be complied with, by all: (1) applicants for or holders of construction permits under 10 CFR part 50 issued after **[INSERT EFFECTIVE DATE OF FINAL RULE]**; (2) applicants for or holders of 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) applicants for or holders of combined licenses, except as discussed further in this section; (5) applicants for or holders of manufacturing licenses, except as discussed further in this section; and (6) applicants for design approvals issued after **[INSERT EFFECTIVE DATE OF FINAL RULE]**. In addition, the aircraft impact rule applies to the four existing design certifications in 10 CFR part 52, appendices A through D, but only if they are referenced in a combined license.

In most cases, paragraph (a) indicates that the requirements of 10 CFR 50.150 apply to "applicants for or holders of" a permit or license. This is because the requirements in 10 CFR 50.150(b) apply to applicants for licenses (as well as other applicants), whereas the requirements for change control in 10 CFR 50.150(d) apply to applicants for and holders of licenses.

Applicants for operating licenses whose underlying construction permits were issued before the aircraft impact rule need not (but may voluntarily choose to) comply with the 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.

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, in accordance with provisions of the rule which are discussed below) with the assessment requirements of the aircraft impact rule, then the COL 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.

The four currently approved design certifications are not required to comply with the aircraft impact rule so long as the certification is not referenced in a license issued by the NRC. However, if one of the four currently approved the design certification is referenced in a combined license application, then the design certification must be amended to comply with the aircraft impact rule no later than the time that the combined license referencing the (amended) design certification is issued. 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.

Paragraph (b) contains the key technical provisions of the aircraft impact rule. Paragraph (b) is divided into two paragraphs, (b)(1) and (b)(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 described in paragraph (b)(1).

Paragraph (b)(1) addresses the assessment of aircraft impact, and is itself subdivided into three paragraphs. This subdivision reflects the NRC's final decision that all combined licenses, construction permits, operating licenses, standard design certifications, standard design approvals, and manufacturing licenses issued after the effective date of the final rule must either comply with the rule, or reference a design certification, design approval, or reactor manufactured under a manufacturing license complying with the rule, as applicable.

Paragraph (b)(1)(i) requires each applicant, other than an applicant for a combined license or a manufacturing license referencing a standard design certification, standard design approval, or reactor manufactured under a manufacturing license, or a design for which a design certification application has been docketed but not granted, as applicable, to perform a design-specific assessment of the effects on the designed facility of the impact of a large, commercial aircraft. The applicants covered by this paragraph include combined license and manufacturing license applicants who chose not to reference a standard design certification, but instead use a "custom" design. Also covered by this paragraph are combined license applicants

that choose to reference a design for which a design certification application has been docketed but not granted. 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. The applicant's assessment must identify and incorporate into the design of the facility those design features and functional capabilities that avoid or mitigate—to the extent practical, and with reduced reliance on operator actions—the effects of the aircraft impact on core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity.

Paragraph (b)(1)(ii) applies to applicants for combined licenses and manufacturing licenses that choose to reference a design certification, including a combined license applicant who references one of the four currently approved design certifications. This paragraph requires such applicants to reference in their applications either:

1. A design certification which meets the requirements of the aircraft impact rule (i.e., a new design certification issued after **[INSERT EFFECTIVE DATE OF FINAL RULE]**, or one of the four currently approved design certifications in part 52, appendices A through D, which has been amended in a final rulemaking to reflect compliance with the aircraft impact rule);

2. An application for an amendment to one of the four currently approved design certifications in part 52, appendices A through D, where the design is being amended to comply with the requirements of the aircraft impact rule; or

3. An application for a new design certification which has been docketed but not granted.

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

The NRC notes that § 50.150(b)(1)(ii) of the final rule affords flexibility to the combined

license applicant who wishes to use one of the four currently approved design certifications, as well as to the original applicant (or another qualified entity) of the referenced design certification. It also does not disturb or otherwise favor any particular commercial arrangement that the license applicant may have with the original applicant of the referenced design certification or with any other entity seeking to utilize one of the four currently approved design certifications. This is because the rule's requirements have two separate directives: one to the license applicant, and the other to the NRC itself. The first directive, in 10 CFR 50.150(b)(1)(ii), requires the license applicant to submit an application referencing one of the following: (1) a design certification which complies with the final aircraft impact rule; (2) an application for an amendment to one of the four currently approved design certifications, where the design is being amended to comply with the aircraft impact rule; or (3) a docketed but not yet issued design certification which, by virtue of 10 CFR 50.150(b)(1)(i), must comply with the aircraft impact rule. By contrast, the second directive, in 10 CFR 50.150(b)(1)(iii), is addressed at the NRC and limits the circumstances under which the NRC may issue a combined license, construction permit, operating license, or manufacturing license. The final rule does not require any particular sequence or timing of licensing application and design certification rulemaking – except that the combined license may only be issued if the license itself references a design certification that meets the requirements of the aircraft impact rule. Nor does the final aircraft impact rule designate one particular class of entities to comply with the aircraft impact rule. Thus, as only one of many possible paths, it would be possible for a combined license applicant to submit an application referencing an amendment to one of the four currently approved designs, where the amendment is for the purpose of complying with the aircraft impact rule. The request for amendment to the currently approved design certification could be submitted by the combined license applicant, the original design certification applicant (or another qualified entity), or by another entity with the capability to supply all of the necessary information for the

NRC to evaluate the amendment request. Upon NRC's review and approval of the design certification amendment and assuming all other necessary requirements were met, the combined license could be issued.

Paragraph (b)(1)(iii) provides that the NRC will issue a combined license, construction permit, operating license, or manufacturing license under one of two situations. The NRC may issue the license if it finds that the design described in the license complies with the requirements of the aircraft impact rule, i.e., the necessary assessment has been performed and the design incorporates design features and functional capabilities as required by the aircraft impact rule. Alternatively, the NRC may issue the license if the license references a design certification, design approval, or manufactured reactor which meets the requirements of the aircraft impact rule. The 10 CFR 50.150(b)(1)(iii) requirement is in addition to other NRC requirements governing the issuance of the applicable license, e.g., 10 CFR 50.50, 50.57, and 52.97, and does not obviate the need for the NRC to make the applicable regulatory findings required by those NRC regulations. The provisions in paragraph (b)(1) of the final aircraft impact rule provide flexibility to the combined license applicant who wishes to use one of the currently approved design certifications with respect to the particular commercial pathway it may pursue to ensure that the currently approved design certification which it references is amended to comply with the aircraft impact rule.

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 the 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.

The final rule requires that the assessment be based on the aircraft impact characteristics specified in the rule. This approach is discussed in more detail in the section-by-section analysis for paragraph (b)(2) in this document.

"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 avoiding or mitigating 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 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 designer must determine, as part of the assessment, whether there are design features and functional capabilities that "avoid or mitigate," to the extent practical, the "effects of the aircraft impact on core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity." The designer must ensure that the survivability of each of these

key safety functions is considered in the initial assessment. By “avoid…the effects of the aircraft impact,” the NRC means that the resulting facility design, with the subject design features and functional capabilities incorporated, prevents the aircraft impact from affecting critical facility SSCs (i.e., through structural damage, shock and vibration effects, or fire). By “mitigate…the effects of the aircraft impact, the NRC means that the equipment that remains functional following the aircraft impact improves the facility’s ability to maintain core cooling capability, containment integrity, spent fuel cooling capability, or spent fuel pool integrity relative to what the facility’s ability to maintain these functions would be without the identified design features and functional capabilities. Thus, the designer’s focus should be on core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity following the aircraft impact. These four plant 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 functional objectives set forth in the aircraft impact rule and the possible need for other objectives. If necessary, the NRC will issue exemptions and impose supplemental functions 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 must avoid or mitigate, “to the extent practical” the effects of the aircraft impact. The NRC intends this standard to include those design features and functional capabilities which are realistically and reasonably feasible from a technical engineering perspective. For example, the NRC believes that it may be practical to employ existing technologies currently in use in the commercial nuclear power industry or in

another industry. However, it would not be practical to introduce a design feature or functional capability that could have adverse safety or security consequences under a different operational or accident scenario. Moreover, the NRC intends that designers include in their designs only those design features and functional capabilities that are reasonable, efficient, and workable. Thus, the final rule does not require a designer to use a design feature or functional capability which is, strictly speaking, technically capable of mitigating the effect of the aircraft impact, but which is not cost-effective or introduces inordinate complexities in integration into the plant design or operational procedures.

Notwithstanding the requirement for applicants to ensure that the effects of the aircraft impact on core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity are considered in the initial assessment, in performing the practicality evaluation, the NRC expects applicants to first consider the effects of the aircraft impact on core cooling capability and spent fuel cooling capability. If core cooling capability can be maintained with the applicant's identified design features and functional capabilities, then no further consideration of practical design features and functional capabilities to maintain containment integrity is necessary. Likewise, if spent fuel cooling capability can be maintained with the applicant's identified design features and functional capabilities, then no further consideration of practical design features and functional capabilities to maintain spent fuel pool integrity is necessary. However, if there are no practical means to maintain core cooling capability, then the applicant must also consider practical design features and functional capabilities to maintain containment integrity. Likewise, if there are no practical means to maintain spent fuel cooling capability, then the applicant must also consider practical design features and functional capabilities to maintain spent fuel pool integrity. The NRC reiterates, however, that the initial aircraft impact assessment must consider the effects of the aircraft impact on all four key safety functions—core cooling capability, containment integrity, spent fuel cooling capability, and spent

fuel pool integrity.

In addition to being practical, the design features and functional capabilities selected by the designer must avoid or mitigate the effects of the aircraft impact with “reduced reliance on operator action.” This means that active operator intervention and initiation of responsive action to maintain core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity should be reduced to the extent practical. 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 reliance on operator action to avoid or mitigate the effects of the aircraft impact. The NRC expects the designer to identify and consider in a reasonable process the goal of reducing operator action in avoiding or mitigating the effects of an aircraft impact. “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.

The identification of potential design features and functional capabilities should be accomplished through a structured process which requires consideration of the insights gained by the assessment of the impact. Because the aircraft impact is a beyond-design-basis event, the methods and acceptance criteria used in the assessment should be based on realistic assumptions. The NRC recognizes that the designers’ approaches for implementing the rule may differ, depending upon the stage of completion of the facility design when this final rule is adopted. 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 an capabilities, and then identify any additional features and capabilities. By contrast, a designer who has not yet commenced detailed design may decide to use an iterative screening process for identifying features and capabilities. By

presenting a performance-based objective, the aircraft impact rule does not require the designer to use a specific methodology, process or approach for identifying practical design features and functional capabilities that reduce reliance on operator actions. The designer may choose any number of ways to meet this performance requirement.

Paragraph (b)(2) specifies the aircraft impact characteristics which must be used by every applicant that must perform the assessment described in paragraph (b)(1). 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 loads 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—viz., domestic flights. The NRC cautions, however, that the more specific assumptions regarding the aircraft impact will be provided in guidance documents and are not explicitly defined in the rule. 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 with a "custom" design," the designer 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.

Paragraph (c) requires the PSAR or FSAR for each license, certification, and regulatory approval application which is subject to 10 CFR 50.150(b)(1)(i) 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 avoid or mitigate, to the extent practical, the effects of the aircraft impact; and (2) a concise description of how the identified design features and functional capabilities avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact. The application should summarize the bases for the

applicant's determination that the selected features and capabilities incorporated into the facility design avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact. The 10 CFR 50.150(c) 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[5] applicable to safety-related and important to safety structures, systems, and components.

Paragraph (d) 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

[5] See 10 CFR 50.69(b)(1)(I) through (xi) for a list of NRC's ''special treatment'' requirements for light water power reactors, which would not be applicable to the design features and functional capabilities, selected by the applicant in accordance with 10 CFR 50.150.

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 (d) 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact. Not all of the actual change controls are presented in paragraph (d). Instead, most of the sections in paragraph (d) cite to an existing regulation presenting the FSAR change controls for that type of license or certification. Thus, in many cases, paragraph (d) 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, avoids or mitigates—to the extent practical and with reduced reliance on operator actions—the effects of the aircraft impact. The rule does not impose an absolute requirement that a change to the facility must maintain whatever level of avoidance or mitigation was achieved by the design before the change or modification. Nonetheless, the NRC expects that absent compelling reasons, a licensee, vendor, or holder of a regulatory approval shall not propose or implement a design change or modification which eliminates a key safety function (*i.e.*, core cooling capability, containment integrity, spent fuel pool cooling capability, spent fuel pool integrity) which was provided by the design before the change or modification. 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 (d)(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(b) 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact.

Paragraph (d)(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(b) 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact.

Paragraph (d)(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 (d)(4)(i) provides that, for combined licenses which are subject to 10 CFR 50.150(b)(1)(i) (i.e., combined licenses that do not reference a design certification,

design approval, or manufactured reactor), 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(b) 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact. 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 (d)(4)(ii) provides that, for combined license applicants or holders which are subject to 10 CFR 50.150(b)(1)(ii), 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(b). 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact.

Paragraph (d)(4)(iii) provides that, for combined license applicants or holders which are not subject to 10 CFR 50.150(b) but reference a manufactured reactor which is subject to 10 CFR 50.150(b), 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 (d)(5)(i) provides that, for manufacturing licenses which are subject to 10 CFR 50.150(b)(1)(i), 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 (d)(5)(ii) provides that, for manufacturing license applicants or holders which are subject to 10 CFR 50.150(b)(1)(ii), 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 (c) of 10 CFR 50.150, is:

1. A description of the design features and functional capabilities credited by the applicant to avoid or mitigate the effects of the aircraft impact; and

2. A description of how such design features and functional capabilities avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact.

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 credited by the applicant to avoid or mitigate the effects of the aircraft impact; and

2. A description of how such design features and functional capabilities avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact.

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 (c) of 10 CFR 50.150 is:

1. A description of the design features and functional capabilities credited by the applicant to avoid or mitigate the effects of the aircraft impact; and

2. A description of how such design features and functional capabilities avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact.

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 (c) of 10 CFR 50.150, is limited to the following:

1. A description of the design features and functional capabilities credited by the applicant to avoid or mitigate the effects of the aircraft impact; and

2. A description of how such design features and functional capabilities avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact.

The 10 CFR 52.157(f)(32) requirement applies only to those manufacturing license applications which are subject to 10 CFR 50.150(b)(1)(i), that is, those manufacturing licenses that do not reference a design certification or design approval. 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. 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, Rockville, Maryland 20852, e-mail pdr.resource@nrc.gov.

NRC's Electronic Reading Room (ERR). The NRC's public electronic reading room is located at 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	ML080420262
Environmental Assessment	X	X	ML081130377
Response to Public Comments	X	X	ML080290007
SECY-08-????, "Final Rule—Consideration of Aircraft Impacts for New Nuclear Power Reactors (RIN 3150-AI19)" (Month Date, 2008)	X	X	ML081050227
Staff Requirements Memorandum for SECY-08-???? (Month Date, 2008)	X	X	ML

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 revising the requirements for new construction permits; new operating licenses; new standard design certifications; new standard design approvals; combined licenses that do not reference a standard design certification, standard design approval, or manufactured reactor; and manufacturing licenses that do not reference a standard design certification or standard design approval to perform an assessment of the effects on the designed facility of the impact of a large, commercial aircraft. The applicant must identify and incorporate into the design those practical design features and functional capabilities that avoid or mitigate the effects of an aircraft impact, addressing core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity. The applicant is required to describe how such design and other features avoid or mitigate, to the extent practical and with reduced reliance on operator actions, 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 identify and incorporate into the design those design features and functional capabilities that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the

aircraft impact on core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel integrity, 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 3,527 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@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 identify and incorporate into the design those design features and functional capabilities that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact on core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity. These requirements apply to applicants for and holders of new construction permits; applicants for and holders of new operating licenses that reference a new construction permit; applicants for new standard design certifications; applicants for new standard design approvals; applicants for and holders of combined licenses that do not reference a standard design certification, standard design approval, or manufactured reactor; and applicants for and holders of manufacturing licenses that do not reference a standard design certification or standard design approval. In addition, the requirements apply to the four existing design certifications in 10 CFR part 52, appendices A through D, but only if they are referenced in a combined license.

Holders of these licenses and certifications 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 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of an aircraft impact.

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 staff 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 will be 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. The applicant is required to identify and incorporate into the design those design features and functional capabilities that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact on core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity. These requirements apply to applicants for new construction permits; new operating licenses that reference a new construction permit; standard design certifications; new standard design approvals; combined licenses that do not reference a standard design certification, standard design approval, or manufactured reactor; and manufacturing licenses that do not reference a standard design certification or standard design approval.

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. The applicant is required to identify and incorporate into the design those design features and functional capabilities that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact on core cooling

capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity. These requirements apply to applicants for and holders of new construction permits; applicants for and holders of new operating licenses that reference a new construction permit; applicants for standard design certifications; applicants for new standard design approvals; applicants for and holders of combined licenses that do not reference a standard design certification, standard design approval, or manufactured; and applicants for and holders of manufacturing licenses that do not reference a standard design certification or standard design.

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 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, 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, 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 core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity.

The remaining attributes (industry implementation 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 and a combined license that

references a currently approved standard design certification. Given the uncertainty in the number of applications for a new construction permit; new operating license; new standard design approval; combined license that does not reference a standard design certification, standard design approval, or manufactured reactor; and manufacturing license that does not reference a standard design certification or standard design, the NRC staff applied its professional judgment in this analysis.

3.4 Assumptions

The regulatory action will apply only to applicants for and holders of new construction permits; applicants for and holders of new operating licenses that reference a new construction permit; applicants for new standard design certifications; applicants for new standard design approvals; applicants for and holders of combined licenses that do not reference a standard design certification, standard design approval, or manufactured reactor; and applicants for and holders of manufacturing licenses that do not reference a standard design certification or standard design approval. It will not apply to a construction permit, operating license, standard design approval, or manufacturing license issued before the effective date of the final rule.

3.5 Analysis

For Sections 3.5.1 through 3.5.8, 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, 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

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 the standard design certification process, this analysis assumes that three applications will be affected by the final rule in the first 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 avoiding or mitigating the effects of an aircraft impact 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 describe how the modified feature or capability avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the applicable aircraft impact. 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 avoiding or mitigating the effects of an aircraft impact. 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

		Operating Costs	
Year*	Number of Standard Design Certification Applications	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 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.

3.5.5 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 that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, 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 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 reassessment must describe how the modified feature or capability avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the applicable aircraft impact. 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 for avoiding or mitigating the effects of an aircraft impact. 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.

3.5.6 Combined License Applications Referencing a Currently Approved Standard Design Certification

Under the regulatory action, an applicant for a combined license who references one of the four currently approved design certifications must comply with the rule by referencing in its application either a currently approved design certification which has been amended to reflect compliance with the aircraft impact rule or an application for an amendment to a currently approved design certification, where the design is being amended to comply with the requirements of the aircraft impact 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 avoiding or mitigating the effects of an aircraft impact. Therefore, no cost-benefit analysis is needed for combined license applications that reference the recertified AP1000 design.

Regarding the other currently approved designs, 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. The NRC has received one combined license application referencing one of these certified designs, and it is expected that this final rule will be effective before the NRC makes a decision on the combined license application. Therefore, it is likely that the combined license applicant will be required to amend their application to comply with the requirements of the aircraft impact rule as described above.

In implementing the regulatory action, the NRC is assuming that the combined license applicant will submit a request to amend the currently approved design 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 that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, 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. In addition, the NRC estimates it will take this applicant 1 staff-month for a one-time cost of $17,000 (1 staff-month x 4 weeks/month x 40 hours/week x $105/hour) to do the administrative work to prepare a request for an amendment to the design certification. Thus, the one-time cost for this applicant to implement the regulatory action is estimated to be $430,000. This analysis assumes that the

application will be affected by the final rule in the first year that the rule is promulgated (i.e., year 0), and therefore, the discounted flow of funds of the implementation costs is $430,000 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 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 reassessment must describe how the modified feature or capability avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the applicable aircraft impact. However, the NRC staff 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 certification at the application stage for avoiding or mitigating the effects of an aircraft impact. 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 ($430,000) which when discounted is $430,000 (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 $438,100 and $434,300 using 3- and 7-percent discount rates, respectively.

3.5.7 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 that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, 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 reassessment must describe how the modified feature or capability avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the applicable aircraft impact. 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 at the application stage for avoiding or mitigating the effects of an aircraft impact. Therefore, no industry cost analysis is needed for this matter.

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.

3.5.8 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 first 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; combined license that does not reference a standard design certification; combined license that references a standard design certification which has not been amended to comply with the final rule; and manufacturing license that does not reference a standard design certification.

Cost to Amend a Currently Approved Design Certification. The NRC assumes that it will take about 1.0 full-time equivalent (FTE) of staff time to complete the rulemaking to amend a currently approved design certification to comply with 10 CFR 50.150, in response to a combined license application referencing one of these certified designs. The cost of this action

is estimated to be $160,000 (1.0 FTE at $160,000), in the first year that the aircraft impact rule is promulgated (i.e., year 0).

Cost to Develop Guidance. The NRC assumes that it will take about 3.0 full-time equivalent of staff time 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				
	Application		Implementation Costs	
Year	Number Reviewed	Category*	Using 7-Percent Discount Rate ($1,000)	Using 3-Percent Discount Rate ($1,000)
1	3	DC	350	365
1	1	COL	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			890	1,215
Cost to Amend a Currently Approved Design Certification			160	160
Cost to Develop Guidance			500	500
Cost to Provide Training			6	6
TOTAL			1,556	1,881

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

3.5.9 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of an aircraft impact.

3.5.10 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 inherent robustness of the facility to avoid or mitigate the effects of the aircraft impact. Furthermore, applicants will need to identify and incorporate into the design those design features and functional capabilities that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact on core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity. 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 facilities 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
COL	640	740
ML	210	310
	Operating Costs	
DC	17.54	30.1
COL	6.5	14.1
ML	1.7	3.4
TOTAL (rounded)	3,100	3,800

* 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	3,100	3,800
NRC	1,556	1,881
TOTAL (rounded)	4,700	5,700

5. Decision Rationale

The total present-valued costs of this action are $5.7 million and $4.7 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 improvements 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 will need to identify and incorporate into the design those design features and functional capabilities that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact on core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity.

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 the backfit rule, 10 CFR 50.109, does not apply to this final rule and, therefore, a backfit analysis is not required, because the final rule does not contain any provisions that will impose backfitting as defined in the backfit rule. The final rule applies to applicants for and holders of new construction permits; applicants for and holders of new operating licenses that reference a new construction permit; applicants for new standard

design certifications; applicants for new standard design approvals; applicants for and holders of combined licenses; and applicants for and holders of manufacturing licenses. In addition, the requirements apply to the four existing design certifications in 10 CFR part 52, appendices A through D, but only if they are referenced in a combined license. The final aircraft impact rule, by ensuring that all design certifications referenced in a combined license comply with the aircraft rule, effectively ensures that the design of every combined license complies with the final rule. The backfitting issues for each of these licenses, certifications, and regulatory approvals are discussed in order below.

The final aircraft impact rule applies to applicants for and holders of construction permits issued after **[INSERT EFFECTIVE DATE OF FINAL RULE]**, the effective date of the aircraft impact rule. To the extent that the final 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 final aircraft impact rule. To the extent that the final 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.

The final aircraft impact rule applies to new standard design certifications and new standard design approvals. To the extent that the final 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 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 52. The final aircraft impact rule does not apply to the four existing standard design approvals that were issued as part of the approval of the four existing design certifications. Hence, there is no backfitting of these existing design approvals. Applicability to the four existing design certifications is discussed later in this section.

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 or are 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.

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 or are 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.

The final aircraft impact rule does not directly change any of the four currently approved design certifications in 10 CFR part 52, appendices A through D. The rule does not legally require that the aircraft impact assessment be performed for the four currently approved design certifications, nor does it require that these designs be modified to include any design features or functional capabilities that meet the criteria in the aircraft impact rule. Nonetheless, the final rule changes the circumstances under which an applicant for combined license may reference one of the four currently approved design certifications. Each of the four currently approved design certification rules contains several provisions generally addressing the referencing of the design certification. None of these provisions contain a proviso requiring that the application be updated to address aircraft impacts. Moreover, Section VI, “Issue Resolution,” of each currently approved design certification rule 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 addition, the NRC has decided that if any of the four currently approved design certifications have not been amended

to comply with the aircraft impact rule, then that design certification must be amended to reflect compliance with the aircraft impact rule the first time that the design certification is renewed under 10 CFR 52.57 through 10 CFR 52.61.

In light of these regulatory provisions, it could be argued that the aircraft impact rule effectively constitutes a change to those four currently approved design certifications, and such a change is governed by the change restrictions in Section VI of the design certification rules, as well as by the more general requirements in 10 CFR 52.63(a)(1). In addition, one may assert that the NRC may not adopt the new limitation on renewal of the four currently approved design certifications in § 52.59(a) unless the NRC finds under § 52.59(b) that the aircraft impact rule constitutes a substantial increase in protection of public health and safety and its implementation costs are justified in view of the increased protection.

Inasmuch as the final aircraft impact rule requirements, as applied to each of the four currently approved design certifications, effectively constitutes a change that is governed by Section VI of the design certification rules and 10 CFR 52.63(a)(1), the NRC has determined that this change is permitted by virtue of Section VIII, “Processes for Changes and Departures,” paragraphs A, B, and C, of the design certification rules and 10 CFR 52.63(a)(1)(vi) and (vii). First, the NRC has determined that the final rule, as applied to the four currently approved design certifications, meets the criteria in § 52.63(a)(1)(vi) and (vii) governing changes to design certifications. The NRC believes that performing the assessment required by the rule, and the incorporation of design features and functional capabilities identified by the assessment, would constitute substantial increases in overall protection of public health and safety and that implementation costs are justified in view of the increased safety. 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. Moreover, all of the four currently approved certified designs contain one or more advance reactor attributes described in the Commission's "Policy Statement on Regulation of Advanced Nuclear Power Plants," (59 FR 35461; July 12, 1994). 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 practical design features and functional capabilities identified under the final aircraft impact rule into the four currently approved design certifications may also serve to further enhance the availability, capability or effectiveness of those advance reactor design attributes incorporated into the four existing design certifications. This enhancement may well provide substantial increases in protection to public health and safety with respect to the four existing design certifications. In addition, if any of the four currently approved design certifications are amended to include such design features and functional capabilities, then all combined licenses referencing that design certification will use those features and capabilities. Standardization is thereby enhanced through amendment of the any one of the four currently approved design certifications to add design features and functional capabilities identified under the provisions of the final aircraft impact rule. 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, is justified in view of the increased safety provided by implementation of the aircraft impact rule. In addition, the final rule's inclusion of the "practicality" criterion for applicants' use in determining

whether to adopt particular design features and functional capabilities serves to limit the cost exposure of the applicant and future licensees using the design by only requiring inclusion of those items which are realistically feasible and cost-effective. In sum, the NRC determines that the aircraft impact rule, as applied to the four currently approved design certifications, meets the criteria in 10 CFR 52.63(a)(1)(vi) and (vii), as well as 10 CFR 52.59(b). Thus, regardless of the particular procedural path by which any of the four currently approved design certifications may be amended to reflect compliance with the aircraft impact rule, all applicable finality and backfitting provisions are satisfied.

In making these determinations, the NRC was aware of several factors. First, 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. Second, 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. Third, the original applicants for three of the four existing design certifications supported modification of existing designs if they were actually referenced by combined license applicants. Fourth, the NRC is aware that Westinghouse Electric company, LLC, which was the applicant for the AP1000 design certification, intends to seek an amendment to the design certification to address the final aircraft impact rule. Fifth, the NRC notes that any adverse backfitting impact is limited inasmuch as no combined license referencing any of the four existing design certifications has been issued, and those submitted applications referencing one of the four

existing design certifications are still in the early stages of NRC review.

The NRC notes that adoption of the aircraft impact rule may indirectly result in the applicant (or another qualified entity) of one of the four existing design certifications voluntarily requesting an amendment to the design certification, in order to address the requirements of the aircraft impact rule (the rule does not mandate such an amendment to the design). Such changes, which would be accomplished through rulemaking, would also be subject to the change restrictions in 10 CFR 52.63. However, the NRC's bases for determining that the aircraft impact rule meets the change criteria in 10 CFR 52.63(a)(1)(vi) and (vii) would also apply to any design certification amendment rulemaking for the purpose of complying with the aircraft impact rule. Thus, the NRC expects that it would also be able to make the necessary findings under 10 CFR 52.63(a)(1)(vi) and (vii) should it be presented with an application to amend any of the four existing design certifications for the purpose of complying with the aircraft impact rule.

The NRC also evaluated whether the final aircraft impact rule's provisions governing the circumstances under which the NRC may issue a combined license referencing one of the four existing design certifications, effectively violates the issue resolution provision in 10 CFR 52.63(a)(5). Upon careful consideration, the NRC has determined that the change restriction in 10 CFR 52.63(a)(5) does not apply to these provisions of the final aircraft impact rule. The NRC's determination is based upon (in addition to the factors noted above) the flexibility afforded by the final aircraft impact rule to a license applicant referencing one of the four existing design certifications, as well as the nuclear power industry's stated preference that all nuclear power plants designed and constructed after **[INSERT EFFECTIVE DATE OF FINAL RULE]** meet the aircraft impact rule. The final aircraft impact rule provides four possible paths for obtaining the objective of the rule if one of the four currently approved design certifications is to be referenced in a combined license application:

1. The currently approved design certification may be amended to reflect compliance with the aircraft impact rule before it is referenced by the combined license applicant.

2. The currently approved design certification may form the basis for an application for a new design certification which complies with the aircraft impact rule and which is adopted in final form before it is referenced by the combined license applicant.

3. The combined license application may reference an application for an amendment to one of the four currently approved design certifications where the design is being amended to reflect compliance with the aircraft impact rule.

4. The combined license application may reference an application for a new design certification based upon one of the four currently approved designs, which is adopted in final form as a new design certification before the combined license is issued.

In light of the flexibility afforded by the final aircraft rule, the NRC determines that the final rule does not represent a violation of the finality provisions of 10 CFR 52.63(a)(5).

As discussed above, the NRC determined that requiring the four currently approved design certifications to comply with the aircraft impact renewal rule at the first renewal of their certifications (if they have not already been amended to comply with the aircraft impact rule) constitutes a substantial increase in protection to public health and safety that justifies the cost of implementing the rule. The NRC evaluated whether 10 CFR 50.150(b)(2)(iv) and the conforming revision to 10 CFR 52.59(a), which implement this requirement governing the renewal of these four design certifications, represent a violation of the limited finality protection provided by 10 CFR 52.59(b), and concludes they do not. The limited finality protections accorded by 10 CFR 52.59(b) requirements does not absolutely preclude the NRC from applying additional or new requirements to the design certification at the renewal stage; the NRC need only find that the additional or new requirement is 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 noted above, the Commission has made this finding on a generic basis in this rulemaking imposing this additional requirement on renewal. Given this finding, adopting this requirement generically - as opposed to making this for each design certification at its first renewal - does not represent any additional diminishment of the regulatory benefit accorded to each of the currently approved standard design certifications. The NRC's adoption of a generic requirement in 10 CFR 50.150(b)(1)(iv) and 10 CFR 52.59(a) governing renewal of the four existing certifications simply changed the timing of the necessary NRC finding required by 10 CFR 52.59(b). Accordingly, the NRC concludes that the limited finality provisions in 10 CFR 52.59(b) have been met in this rulemaking, and need not be re-made at the time of the first renewal of any of the four currently approved design certifications.

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 construction permit and operating license applications; technical information.

* * * * *

(a) * * *

(13) On or after **[INSERT EFFECTIVE DATE OF FINAL RULE]** stationary power reactor applicants who apply for a construction permit which is subject to 10 CFR 50.150 shall submit the information required by 10 CFR 50.150 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 shall submit the information required by 10 CFR 50.150 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) Applicability. The requirements of this section apply to:

(1) Applicants for and holders of construction permits for nuclear power reactors issued under this part after **[INSERT EFFECTIVE DATE OF FINAL RULE]**;

(2) Applicants for and holders of operating licenses for nuclear power reactors issued under this part for which a construction permit was issued after **[INSERT EFFECTIVE DATE OF FINAL RULE]**;

(3) Standard design certifications issued under part 52 of this chapter;

(4) Applicants for standard design approvals issued under part 52 of this chapter after **[INSERT EFFECTIVE DATE OF FINAL RULE]**;

(5) Applicants for and holders of combined licenses issued under part 52 of this chapter; and

(6) Applicants for and holders of manufacturing licenses issued under part 52 of this chapter.

(b) Assessment requirements.

(1) Assessment.

(i) Each applicant, other than an applicant for a combined license or a manufacturing

license referencing a standard design certification, standard design approval, or reactor manufactured under a manufacturing license, or a design for which a design certification application has been docketed but not granted, as applicable, shall perform a design-specific assessment of the effects on the facility of the impact of a large, commercial aircraft. The applicant shall identify and incorporate into the design those design features and functional capabilities that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact on core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity.

(ii) Each applicant for a combined license or a manufacturing license referencing either a standard design certification or a design for which a design certification application has been docketed but not granted, shall reference in its application:

(A) A design certification which meets the requirements of this section:

(B) A design certification in effect on **[INSERT EFFECTIVE DATE OF FINAL RULE]** for which a design certification amendment application meeting the requirements of this section has been docketed but not granted; or

(C) A design for which a design certification application meeting the requirements of this section has been docketed but not granted.

(iii) Notwithstanding other NRC requirements, the NRC may issue a combined license, construction permit, operating license or manufacturing license only if the NRC finds that either the applicant has complied with the requirements of this section, or the license references a design certification, design approval, or reactor manufactured under a manufacturing license meeting the requirements of this section, as applicable.

(iv) If a standard design certification in effect on **[INSERT EFFECTIVE DATE OF FINAL RULE]** has not been amended to comply with the requirements of this section, then the standard design certification must comply with the requirements of this section at the first

renewal of the standard design certification.

(2) *Aircraft impact characteristics.* 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.

(c) *Content of application.* For applicants subject to paragraph (b)(1)(i) 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 (b)(1)(i) of this section; and

(2) How the design features and functional capabilities identified in paragraph (b)(1)(i) of this section avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact.

(d) *Control of changes.*

(1) For construction permits which are subject to 10 CFR 50.150(b), 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(b) 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact.

(2) For operating licenses which are subject to 10 CFR 50.150(b), 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(b) 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact.

(3) For standard design certifications which are subject to 10 CFR 50.150(b), 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 10 CFR 50.150(b)(1)(i), 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(b) 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 avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact.

(ii) For combined license applicants or holders which are subject to 10 CFR 50.150(b)(1)(ii), 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 license applicants or holders which are not subject to 10 CFR 50.150(b) but reference a manufactured reactor which is subject to 10 CFR 50.150(b), 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 10 CFR 50.150(b)(1)(i), 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 license applicants or holders which are subject to 10 CFR 50.150(b)(1)(ii), 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, the information required by 10 CFR 50.150.

* * * * *

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, the information required by 10 CFR 50.150.

* * * * *

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, the information required by 10 CFR 50.150.

* * * * *

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, the information required by 10 CFR 50.150.

Dated at Rockville, Maryland, this __ day of _____ 2008.

For the Nuclear Regulatory Commission.

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

Environmental Assessment Supporting Final Rule, 10 CFR Parts 50 and 52—Consideration of Aircraft Impacts for New Nuclear Power Reactors

U.S. Nuclear Regulatory Commission

September 2008

[7590-01-P]

UNITED STATES NUCLEAR REGULATORY COMMISSION

ENVIRONMENTAL ASSESSMENT AND FINDING OF

NO SIGNIFICANT IMPACT

The Nuclear Regulatory Commission (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 requirements affected by this rulemaking include Title 10, Section 50.8, "Information Collection Requirements: Office of Management and Budget Approval," of the *Code of Federal Regulations* (10 CFR 50.8); 10 CFR 50.34, "Contents of Construction Permit and Operating License Applications; Technical Information"; 10 CFR 50.111, "Criminal Penalties"; 10 CFR 50.150, "Aircraft Impact Assessment"; 10 CFR 52.47, "Contents of Applications; Technical Information"; 10 CFR 52.59, "Criteria for Renewal"; 10 CFR 52.79, "Contents of Applications; Technical Information in Final Safety Analysis Report"; 10 CFR 52.137, "Contents of Applications; Technical Information"; and 10 CFR 52.157, "Contents of Applications; Technical Information in Final Safety Analysis Report."

The 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. 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[1] designers to perform a rigorous assessment of the design to identify design features and functional capabilities that could provide additional inherent protection to avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of an aircraft impact. 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 requirements to perform an aircraft impact assessment apply to applicants for the following: new construction permits; new operating licenses that reference a new construction permit; new standard design certifications; new standard design approvals; combined licenses that do not reference a standard design certification, standard design approval, or manufactured reactor; and manufacturing licenses that do not reference a standard design certification or standard design approval. In addition, the requirements apply to the four existing design certifications in 10 CFR Part 52, Appendices A through D, but only if they are referenced in a combined license. These applicants are required to perform an assessment of the effects on the designed facility of the impact of a large, commercial aircraft. Applicants must identify and incorporate into the design those practical design features and functional capabilities that avoid or mitigate the effects of an aircraft impact, addressing core cooling

[1] 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 environmental assessment, 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.

capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity. Applicants are required to describe how such design features and functional capabilities avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of an aircraft impact.

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) (10 CFR 73.1, "Purpose and Scope). 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 current requirements, in conjunction with the currently proposed revisions to 10 CFR 50.54 to address loss of large areas of the plant due to explosions or fires (73 FR 19443), 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 practical features that would avoid or mitigate 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." 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 increase the safety of new nuclear power plants for aircraft impacts and is consistent with these policy statements.

This new aircraft impact assessment rule complements the proposed revisions to 10 CFR 50.54(hh) to mitigate the effects of large fires and explosions. The proposed 10 CFR 50.54(hh) provisions on mitigating large fires and explosions would codify the adequate protection requirement imposed on existing operating reactors by Interim Compensatory Measures (ICM) Order, Item B.5.b. The provisions of 10 CFR 50.54(hh), 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 that would comply with

these proposed 10 CFR 50.54(hh) requirements, and would not require any additional action to comply with these proposed rule provisions. New applicants for and new holders of operating licenses under 10 CFR Part 50 and combined licenses under 10 CFR Part 52 would be required to develop and implement procedures that would 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 described in proposed 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 proposed 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 proposed 10 CFR 50.54(hh) is based as being necessary for reasonable assurance of adequate protection.

In contrast to the adequate protection requirements of proposed 10 CFR 50.54(hh), this aircraft impact final rule will enhance safety and security by requiring an assessment of newly designed facilities to avoid or mitigate the effects of aircraft impacts. New nuclear power reactor applicants will be subject to both the requirements of the aircraft impact rule and the proposed 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, commercial 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 the proposed 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 Part 50.54(hh) rulemakings to be complementary in scope and objectives. The aircraft impact rule focuses on enhancing the design of future nuclear power plants to withstand large, commercial aircraft impacts, with reduced reliance on operator actions. Proposed 10 CFR 50.54(hh) focuses 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.

The NRC's determination that the impact of a large commercial aircraft at a nuclear power plant is a beyond design basis event is consistent with the NRC's consideration in the mid-1980's of potential 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 continues to be applicable, and supports the NRC's conclusion in this final rulemaking that although new power reactors should be assessed for aircraft impacts and designed to avoid or mitigate the effects of an aircraft impact, existing reactors and designs provide adequate protection of the public health and safety and common defense and security.

ENVIRONMENTAL ASSESSMENT

Identification of the Action:

The objective of this rulemaking is 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 that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact on core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity. In addition, these amendments contain requirements for control of changes to any design features or functional capabilities credited for avoiding or mitigating the effects of an aircraft impact. These requirements apply to applicants for and holders of new construction permits; applicants for and holders of new operating licenses that reference a new construction permit; applicants for new standard design certifications; applicants for new standard design approvals; applicants for and holders of combined licenses; and applicants for and holders of manufacturing licenses. In addition, the requirements apply to the four existing design certifications in 10 CFR Part 52, Appendices A through D, but only if they are referenced in a combined license. The final aircraft impact rule, by ensuring that all design certifications referenced in a combined license comply with the aircraft rule, effectively ensures that the design of every combined license complies with the final rule. 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 approach proposed in this rulemaking will maintain a level of specificity in 10 CFR Part 50 and 10 CFR Part 52 that is comparable to the current regulations, while revising requirements to be consistent with Commission direction 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 Need for the Action:

The purpose of this action is to implement a regulatory process to require nuclear power plant designers to perform a rigorous assessment of the design of the facility to identify and incorporate into the design those design features and functional capabilities that could provide additional inherent protection to avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of an aircraft impact.

Environmental Impacts of the Final Action:

The NRC has concluded that there will be no significant adverse radiological environmental impacts associated with implementation of the final rule. The rule essentially will result in all newly designed and constructed nuclear power plants using designs that have been assessed to determine the effects of the impact of a large commercial aircraft, and to have design features and functional capabilities to address such impacts to the extent required by the rule. The impact of a large, commercial aircraft is a beyond-design-basis event. Thus, the final rule will not require changes to the design basis functional requirements for the facility's structures, systems, and components that function to limit the release of radiological effluents during and following postulated accidents. As a result, all of the structures, systems, and components associated with limiting the releases of offsite radiological effluents will continue to

be able to perform their functions; consequently, there will be no significant radiological effluent impact. The NRC also notes that, to the extent that that the rule results in the incorporation of such design features and functional capabilities into the design of nuclear power plants, there is the potential for a decrease in radiological consequences attributable to the beyond design basis event of an aircraft impact. While this is not the primary basis for the NRC's determination on the lack of environmental impact attributable to the final aircraft impact rule, it does provide additional context for the NRC's determination in this regard.

In addition, the standards and requirements applicable to radiological releases and effluents are not affected by this rulemaking and continue to apply to the nuclear power reactors affected by this rulemaking. Implementation of the final rule will not result in impacts to a facility related to normal operation and any associated releases.

Therefore, this action will not significantly increase the probability or consequences of accidents, nor result in changes in the types of any effluents that may be released offsite, and will not result in a significant increase in occupational or public radiation exposure.

Alternatives to the Action:

As an alternative to the rulemaking described above, the NRC considered not taking the action (i.e., the "no-action" alternative). Not revising the regulations for applicants for new nuclear power reactors would result in no change in current environmental impacts since these requirements have no environmental impact and taking no action therefore results in no net change to the environment. However, the no-action alternative would not change the governing regulations for these applicants and the regulations will not reflect the need for nuclear power plant designers to perform a rigorous assessment of the design of the facility to identify and incorporate into the design those design features and functional capabilities that could provide

additional inherent protection to avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of an aircraft impact. The NRC has concluded that requiring applicants for new nuclear power reactors to perform an aircraft impact assessment is a desirable regulatory outcome, and has rejected the no-action alternative.

Alternative Use of Resources:

This action does not involve the use of any resources not previously considered by the NRC in its past environmental statements for issuance of standard design certifications, construction permits, operating licenses, combined licenses, and manufacturing licenses for nuclear power reactors.

Agencies and Persons Consulted:

The NRC developed the final rule and this environmental assessment. In accordance with its stated policy, the NRC provided a copy of the proposed rule to designated liaison officials for each State. No other agencies were consulted.

FINDING OF NO SIGNIFICANT IMPACT

On the basis of the environmental assessment, the NRC concludes that the action will not have a significant effect on the quality of the human environment. Accordingly, the NRC has determined not to prepare an environmental impact statement for the action.

Documents may be examined and/or copied for a fee, at the NRC's Public Document Room, located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland 20852. Publicly available records will be accessible electronically from the Agencywide

Documents Access and Management System Public Library component on the NRC Web site at http://www.nrc.gov (Electronic Reading Room).

Dated at Rockville, Maryland, this 26 day of September 2008.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Michael J. Case, Director
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Analysis of Public Comments on Consideration of Aircraft Impacts for New Nuclear Power Reactors RIN 3150-AI19

Comments on this proposed rule are available electronically at the NRC's electronic Reading Room at http://www.nrc.gov/reading-rm/adams.html. From this page, the public can gain entry into ADAMS, which provides text and image files of NRC's public documents. Comments were received from the following individuals or groups:

Letter No.	ADAMS No.	Commenter Affiliation	Commenter Name	Abbreviation
1	ML072890190	Private citizen	Kent Halac	Halac
2	ML073100293	Private citizen	John Sweeney	Sweeney
3	ML073521551	Beyond Nuclear	Paul Gunter	Beyond Nuclear
4	ML073521553	Pilgrim Watch	Mary Lampert	Pilgrim Watch
5	ML073521555	Cape Downwinders	David Agnew	Cape Downwinders
6	ML073521557	Private citizen	Reiner Schmidt	Schmidt
7	ML073530443	NC Waste Awareness and Reduction Network	John Runkle	NC WARN
8	ML073530472	Private citizen	Amy Coldren	Coldren
9	ML073530474	Alliance for Nuclear Responsibility	Rochelle Becker	A4NR
10	ML073530476	Morgan, Lewis & Bockius LLP	Steven Frantz and Stephen Burdick	Morgan Lewis
11	ML073530533	Private citizen	Jeannine Honicker	Honicker
12	ML073530535	Three Mile Island Alert	Scott Portzline	TMI Alert
13	ML073530537	New York State Office of Homeland Security	F. David Sheppard	NYS OHS
14	ML073530538	Winston & Strawn LLP	David Repka	Winston&Strawn
15	ML073530542	AREVA NP Inc.	Ronnie L. Gardner	AREVA NP
16	ML073530546	Weidlinger Associates Inc.	Jim Weeks	Weidlinger
17	ML073530552	New York State Office of the Attorney General	Morgan A. Costello and John Sipos	NYS AG
18	ML073530561	Northern Lights Engineering, LLC	Ulrich Witte	Northern Lights
19	ML073530569	Greenpeace	Jim Riccio	Greenpeace
20	ML073530613	Sierra Club Radiation Committee	Linda Modica	Sierra
21	ML073530621	Private citizen	Bobbie Paul	Paul
22	ML073530630	Committee to Bridge the Gap	Daniel Hirsch	CBG
23	ML073530637	Nuclear Energy Institute	Adrian Heymer	NEI
24	ML073530644	Private citizen	Caroline Rivard	Rivard
25	ML073530654	Private citizen	Marvin Lewis	Marvin Lewis
26	ML073530699	UniStar Nuclear Energy	George Vanderheyden	UniStar
27	ML073530484	C-10 Research and Education Foundation	Sandra Gavutis	C10
28	ML073540027	GE-Hitachi Nuclear Energy	Patricia Campbell	GEH
29	ML080160293	Union of Concerned Scientists	David Lochbaum and Edwin Lyman	UCS
30	ML073610596	Southern Nuclear Operating Company	Dale Lloyd	SNC
31	ML073610597	Westinghouse Electric Company	W.E. Cummins	Westinghouse
32	ML080070343	Nuclear Energy Information Service	David Kraft	NEIS

This document places each public comment into one of the following categories:

I. Responses to Specific Request for Comments
II. Overall Need for New Nuclear Power Plant Designs to Address Aircraft Impacts
III. Applicability of the Rule
IV. Adequate Protection and Consideration of Aircraft Impacts as "Beyond-Design-Basis" Events
V. Aircraft Characteristics
VI. Aircraft Impact Assessment
VII. Evaluation of Design Features, Functional Capabilities, and Strategies
VIII. Issue Resolution and Regulatory Implementation Issues
IX. Protection of Safeguards Information and Other Sensitive Information
X. Compliance with the National Environmental Policy Act (NEPA)
XI. Other Comments

Within each category, the NRC has either repeated comments as written by the commenter or summarized the comments for conciseness and clarity. At the end of the comment or comment summary, the NRC references the specific public comments and the letters by which they were provided to the NRC. Except for those comments in Category I, specific comments are referred to in the form [XXX]-[YYY]-[ZZZ], where:
[XXX] represents the commenter abbreviation from the table on page 1 of this document,
[YYY] represents the letter number from the same table, and
[ZZZ] represents the NRC-assigned sequential comment number as noted in the right margin of the annotated copy of the public comments (ADAMS No. ML0824605591). Note: Where specific comments were grouped together by the commenter but needed to be addressed separately, the NRC has added a lower case alpha character to the comment number for uniqueness.

I. Responses to Specific Request for Comments

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 Final Safety Analysis Report (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 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 (NEI, Morgan Lewis, and 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 § 52.500(c) need be included. In a separate comment, NEI expressed its view that the submittal on aircraft impacts would be classified as a safeguards document.

NRC Response: The NRC agrees with the commenters. The final rule does not require that the assessment of aircraft impacts be included in the 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(c) does require that a description of the design features and functional capabilities credited by the applicant to avoid or mitigate the effects of the aircraft impact be included in the FSAR submitted with the relevant application. In addition, the FSAR must contain a description of how such design features and functional capabilities avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact. 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 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 Part 100 dose limits as acceptance criteria for the aircraft impact rule. NEI and Morgan Lewis asserted that the use of Part 100 dose limits would imply that the aircraft impact is a design basis event, inasmuch as Part 100 dose limits are utilized to evaluate the acceptability of design features addressing design basis events. Use of 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) spent fuel cooling or spent fuel pool integrity is maintained.

NRC Response: The NRC agrees, in part, with the commenters' recommendations for alternative acceptance criteria. The NRC agrees that 10 CFR Part 100 dose limits should not

be used for the purpose of this rule, and that the concepts of maintaining core cooling, containment integrity, spent fuel cooling and spent fuel pool integrity must be addressed in the assessment; however, the NRC does not view the maintenance of these functions as absolute acceptance criteria which must be met by each design. Instead, they are objectives that are to be achieved to the extent that it is practical to do so, and without any increased reliance upon operator action.

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. Therefore, the acceptance criterion contained in the final rule by which the NRC may judge the required assessment continues to be the practicality criterion addressed in 10 CFR 50.150(b) and (c), that is, that the applicant must describe how the design features and functional capabilities avoid or mitigate, to the extent practical, the effects of the aircraft impact with reduced reliance on operator actions. In addition, the NRC is making it clearer in the final rule that the assessment must address the effects of the aircraft impact on the key safety functions of core cooling, containment integrity, spent fuel cooling, and spent fuel pool integrity.

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 period of 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 applicants 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 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 this document. Nonetheless, the original applicant (or successor in interest of any of the four current standard design certifications) 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 this document. 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 to do otherwise would introduce inconsistency into the regulatory process. One industry commenter (Morgan Lewis) agreed with NEI, adding that if the holder of an existing design certification does not voluntarily comply with the rule, then combined license (COL) applicants that reference that design certification will still be required to comply with the proposed § 73.55 amendment, and these applicants would not receive the benefits of any design changes in response to this proposed rule on aircraft impacts. As encouraged by the proposed rule, commenters noted that reactor vendors with existing design certifications may voluntarily request the NRC to amend the design certifications in order to address aircraft impacts. 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. Commenters also stated that COL applicants that reference the amendment to a design certification that voluntarily complies with the aircraft impact rule should be treated the same as a COL 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 COLs that reference a design certification that has not been amended to address the aircraft impact rule.

The NRC notes that, in a change in position from that described in the proposed aircraft impact rule, the NRC has determined in the final aircraft impact rule that the four currently approved standard design certifications in Appendices A through D to 10 CFR Part 52 should be required to comply with the final aircraft impact rule, but only if one of those design certifications is referenced in a combined license, or upon renewal if, at the time of renewal, the design certification has not been amended to comply with the aircraft impact rule. The reasons for this change in position are set forth in the statement of considerations for the final aircraft impact 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 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 a 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 would be required to comply with the requirements in proposed 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 in order 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 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 Part 50 construction permit applicants, then the requirements should be included in Part 50, consistent with the general principle established in the recent Part 52 rulemaking (72 FR 4935; August 28, 2007).

NRC Response: The NRC agrees with the commenter who stated that, if the aircraft impact rule's requirements are to be imposed on future Part 50 construction permit applicants, then the requirements should be included in Part 50. 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 are relocated from 10 CFR 52.502 as proposed to 10 CFR 50.150(d). These sections were relocated in order 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, since 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 and 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. Another 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 reviews performed 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 and 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 COL applicants should be the same scope as the assessment required for a new design certification. This would ensure consistency among all COL 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 at the time it is performing the aircraft impact assessment. Design certification, design approval, and manufacturing license 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 are subject to the final rule will have the entire facility design available for consideration. 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 proposed 10 CFR 73.55 and Appendix C to 10 CFR Part 73 than will a "custom" combined license holder that has assessed the entire facility at the design stage in accordance with this final rule. For the reasons set forth above, the NRC has not made any changes to the assessment requirements for combined license applicants in the final rule.

II. Overall Need for New Nuclear Power Plant Designs to Address Aircraft Impacts

Comment: The proposed rule, if adopted, would result in newly-designed power reactor facilities being more robust with regard to potential aircraft impacts and therefore provide an enhanced level of protection. This is consistent with longstanding NRC policies on advanced reactor designs, in which the NRC stated that newly-designed facilities should be more inherently robust and have enhanced safety margins. The US EPR design has been developed with these principles in mind. (UniStar-26-1)

NRC Response: The NRC generally agrees with the commenter that nuclear power facilities' whose designers include features identified as the result of implementation of the final rule will be more robust with regard to potential impacts of large, commercial aircraft. The NRC expresses no view in the rulemaking with respect to the U.S. EPR design. The commenter's views formed part of the bases for the NRC's determination that all new nuclear power plants designed and constructed after the effective date of the final aircraft impact rule must comply with the aircraft impact rule, including those that reference one of the four currently approved design certifications. These views also formed part of the bases for NRC's determination that if the four currently approved design certifications have not been amended to comply with the aircraft impact rule at the time of renewal of the design certification, that the certified design must comply with the aircraft impact rule in order for the NRC to renew the design certification. The final aircraft impact rule reflects these NRC determinations.

Comment: The proposed rule should be adopted. Public support for new nuclear power reactors is strongly tied to the safety of the facility. In light of the events of September 11, 2001, the nuclear industry must address the public's concerns with aircraft impacts at new nuclear power plants. This important principle is key to public support for new nuclear. The ability of the commenter (an electric power company) to reliably produce power with low carbon emissions and contribute to the country's energy security hinges on a successful demonstration of the security of the nuclear energy infrastructure with respect to, among others, aircraft impacts. Addressing aircraft hazards at the design phase-before any plants have been built-rather than in individual combined license applications, will also increase standardization and thus operational efficiencies across the fleet. Resolving these issues at the design stage will also reduce licensing uncertainty for the design vendors and combined license applicants. It is prudent for nuclear power plant designers to take into account the potential

effects of the impact of a large, commercial aircraft. ((AREVA NP-15-1, NYS OHS-13-1, UniStar-26-2)

NRC Response: The NRC agrees with the commenters that it is prudent for nuclear power plant designers to take into account the effects of the impact of a large, commercial aircraft, in order to enhance public confidence in a manner which maintains standardization, facilitates operational efficiencies, and reduces regulatory uncertainty for all stakeholders. The commenters' views formed part of the bases for the NRC's determination that all new nuclear power plants designed and constructed after the effective date of the final aircraft impact rule must comply with the aircraft impact rule, including those that reference one of the four currently approved design certifications. These views also formed part of the bases for NRC's determination that if the four currently approved design certifications have not been amended to comply with the aircraft impact rule at the time of renewal of the design certification, that the certified design must comply with the aircraft impact rule in order for the NRC to renew the design certification. The final aircraft impact rule reflects these NRC determinations.

Comment: The proposed rule should not be adopted because: (1) nuclear power plants, as part of the civil infrastructure similar to refineries and tall buildings, are guarded against terrorist attack by the U.S. military and intelligence agencies; (2) nuclear power plant operators should not be responsible for counteracting threats which are properly the responsibility of the US military and intelligence agencies;(3) the U.S. government and private industry have already taken actions, such as the hardening of commercial aircraft cockpit doors, to reduce the possibility of a successful aircraft attack similar to that which occurred on September 11, 2001; and (4) the economic burden of the proposed regulation is not justified, and would render uneconomical the electrical energy generated by a nuclear power plant. (Halac-1-1a)

NRC Response: The NRC agrees with the commenter's first three points set forth above. However, the NRC does not agree with the commenter's conclusion that these points inevitably lead one to argue against adoption of the proposed rule. As discussed elsewhere, the primary purpose of this rule is to enhance, in a cost-effective manner, protection of public health and safety and common defense and security for new nuclear power reactors. While the NRC agrees that nuclear power plant operators are not responsible for "counteracting" (i.e., preventing or responding to) threats which are the proper province of the U.S. military and intelligence agencies, it by no means forecloses the potential for possible NRC action requiring design enhancements to new nuclear power reactors to withstand the effects of a certain class of threats, *viz.*, impacts of a large, commercial aircraft.

The NRC also disagrees with the commenter's fourth point, that the economic burden of the rule is unjustified. The proposed rule sets forth requirements at the *design stage* for an assessment of aircraft impacts, and an evaluation of *potential* design features and functional capabilities that would be practical (*i.e.*, technically feasible and cost-effective). Thus, a reactor designer is not required to include within its design any impractical design features or functional capabilities. Accordingly, the NRC disagrees with the commenter that the economic burden of the proposed rule is unjustified, or would render uneconomical power generation by future nuclear power plants. No change was made to the final rule as a result of these comments.

Comment: The proposed rule should not be adopted, inasmuch as it is harder for a large commercial aircraft to impact a reactor building which is relatively small, as compared to

impacting a 104-story building [such as the World Trade Center]. (Halac-1-1b)

NRC Response: The NRC disagrees with the commenter. The commenter assumes that the "reactor building" – which the NRC interprets as being the reactor containment building – is the only possible target at a nuclear power plant. A person with malevolent intent has multiple targets in a relatively confined area which could be selected. This may increase the probability of an impact which has an adverse affect on the facility. Hence, the aircraft impact rule does not simply require the designer to analyze impacts on the reactor containment building, but on the overall facility. No change was made to the final rule as a result of this comment.

III. Applicability of the Rule to Entities and NRC Regulatory Processes

A. Applicability to Currently Operating Reactors

Comment: Requiring only new nuclear reactor designs to comply with the proposed rule would result in terrorists directing attacks at only existing plants, which would not result in any measurable increase in overall protection of the public.(Halac-1-2)

Comment: The proposed rule would increase the terrorist threat to unassessed plants and persons living near them. Labeling one set of nuclear power plants as better protected would tend to focus terrorist actions on unassessed plants. This is inconsistent with legal requirements for regulations governing nuclear power plants [identified by the commenter in a separate line of comment as 42 USC 2201(i)(3)]. (Northern Lights-18-4)

Comment: The proposed rule should apply to all currently operating power reactors to ensure adequate protection to public health and safety. It is arbitrary and capricious to treat aircraft impacts to nuclear power plants and spent fuel facilities as beyond design basis, in light of prior studies cited by the commenters (including GE, Indian Point, Argonne National Laboratories, and NUREG-1738, NUREG/CR-2859), showing the vulnerability of these facilities to attacks using explosive devices, including aircraft, and the lack of NRC explanation reconciling these studies with the detailed, site-specific engineering studies of a limited number of nuclear power plants referenced in the statement of considerations for the proposed rule. (NYS AG-17-1; NC WARN-7-1; Beyond Nuclear-3-2.a, Beyond Nuclear-3-2.b)

Comment: Public health, safety and common defense is neither preserved or enhanced by exempting 104 reactors and spent fuels pools from truly preventive requirements. We now know which reactors terrorists would target first. ALL reactors should be subject to this rule; and reactors which have been granted operating license extensions should also meet the requirements of this rule, or forfeit their extension. This rule should be about defending the nation and its people from the reality of 9-11-2001. This rule is akin to requiring post-Titanic retrofits against iceberg damage on only the port side of ships. (NEIS-32-3)

Comment: Documents from NRC and other sources contradict NRC's claim that operating reactors are adequately protected and can be exempted from further aircraft impact hazard assessment. (Pilgrim Watch-4-1.c)

NRC Response: The NRC does not know what, if any, factors may be considered by a person

with malevolent intent when selecting a nuclear power plant as a potential target. Accordingly, the NRC is unable to determine whether or not the commenters' assertions in this regard are likely to be true. However, the NRC notes that existing operating nuclear power plants have been the subject of substantial regulatory action which has resulted in a considerable enhancement of the capabilities of current nuclear power plants to withstand or mitigate the consequences of such an attack. These security enhancements, discussed in more detail below, coupled with the already-substantial capability of many plant designs to adverse conditions, may render the entire nuclear power plant fleet as less desirable than other potential civilian targets. Contrary to the commenters' assertions, the NRC believes that there will be an increase in overall protection of the public as a result of this rule.

The NRC also does not agree with the commenters that it is "arbitrary and capricious" to treat aircraft impacts as beyond-design-basis events and, therefore, that the rule should apply to currently operating reactors. As stated in the statement of considerations for the final rule, the Commission-approved final design basis threat (DBT) does not include an aircraft attack (72 FR 12705; March 19, 2007), because 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. The NRC continues to hold this position, and further concludes that this position also supports the NRC's determination that the aircraft impact rule need not be applied to currently operating reactors. 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 has proposed incorporating the continuing requirement to provide for such mitigative measures in the NRC's regulations in a proposed supplement to the power reactor security requirements proposed rule (73 FR 19443; April 10, 2008).

The current requirements will continue to provide adequate protection of the public health and safety and the common defense and security for existing reactors. Nevertheless, the Commission has decided to also require relevant applicants to incorporate into their design additional practical features that would avoid or mitigate the effects of an aircraft impact. This new rule to address the capability of new nuclear power reactors relative to a potential 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. In this way, the NRC is encouraging designers of new facilities 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.

Regarding the comments related to applicability of the rule to spent fuel pools, as is indicated in the final rule, the covered applicants are required to assess the effect of the aircraft impact on spent fuel cooling and spent fuel pool integrity. No change was made to the final rule as a result of these comments.

Comment: Terrorist factions come in waves and eventually disappear by arrest, political solutions or societal developments (see urban guerillas in Germany in the 1970s). The current, very dangerous threat is now and may persist in the next 10 to 20 years. Therefore a limitation

of the rule to new standard design certifications, etc. is inappropriate, since the 100 existing plants and current COLs are not included. (Schmidt-6-1 portion)

Note: The portion of this comment related to current COLs is addressed in Section III.B, "Applicability to Currently Approved Standard Design Certifications and Combined Licenses Referencing these Certifications," of this document.

NRC Response: The NRC agrees with this comment to the extent that it suggests that the threat of terrorism to currently-licensed and operating nuclear power facilities is unpredictable for the next 10-20 years, and therefore such facilities must be protected against such threats. However, the NRC disagrees with the comment to the extent that it suggests that the only viable way of providing such protection is through backfitting of the aircraft impact rule on existing facilities. As discussed in the statement of considerations for both the proposed and final rule the NRC has reasonable assurance of adequate protection of currently operating nuclear power plants (including facilities relevant to radiological health and safety such as spent fuel pools) through, inter alia, the physical protection and security measures which the NRC has imposed at all licensed nuclear power facilities after the events of September 11, 2001. By the ICM Order dated February 25, 2002, 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 has proposed incorporating the continuing requirement to provide for such mitigative measures in the NRC's regulations in a proposed supplement to the power reactor security requirements proposed rule (73 FR 19443; April 10, 2008). The commenter has not demonstrated that these measures are insufficient to provide adequate protection (see NRC responses to commenters' assertions that existing information and studies on the capability of currently-licensed nuclear power facilities to withstand an aircraft impact demonstrate that adequate protection is not provided). No change was made to the final rule as a result of this comment.

Comment: The proposed rule should cover all currently-operating nuclear power plants and related facilities such as spent fuel pools. Failing to do so would be inconsistent with the requirement under the AEA, 42 USC 2201(i)(3) for regulations which maximize the protection of life and property. (Northern Lights-18-3)

NRC Response: The NRC disagrees with this comment. As discussed in the statement of considerations for both the proposed and final rule, the NRC has reasonable assurance of adequate protection of currently operating nuclear power plants (including facilities relevant to radiological health and safety such as spent fuel pools) through, inter alia, the physical protection and security measures which the NRC has imposed at all licensed nuclear power facilities after the events of September 11, 2001. The NRC disagrees with the commenter's contention that Section 161.(i)(3), 42 U.S.C. 2201(i)(3), requires that NRC regulations must "maximize" the protection of life and property. In fact, Section 161 provides that the NRC "is authorized to…prescribe such regulations…*as it may deem necessary*…(3) to govern any activity authorized pursuant to this chapter…in order to…*minimize* danger to life or property (emphasis added)." The statute gives the Commission substantial discretion to promulgate regulations, and states that those regulations may be issued in order to "minimize danger" to life or property. The NRC reiterates that current NRC requirements (i.e., license conditions, orders to nuclear power plant licensees, and applicable regulations) provide, at minimum,

reasonable assurance of adequate protection to public health and safety, and in fact provide an enhanced level of protection to public health and safety, common defense and security, and life and property. No change was made to the final rule as a result of this comment.

Comment: The proposed rule should apply to all currently operating power reactors because they have inadequate and non-compliant safety-related fire protection systems. Fire protection is vital security infrastructure, yet it is well documented that the nuclear power industry does not comply with current NRC requirements for safe shutdown systems under 10 CFR 50.48, 10 CFR Part 50, Appendix R, Paragraph III.G.2, and Branch Technical Position 9.5.1. These non-compliances relate to the installation of fire barriers which do not meet ASTM E-119 standardized time/temperature fire tests. The industry and NRC are moving to implement a compliance strategy that would substitute the use of manual actions for reliance on passive fire barriers. The substitution of operator actions for qualified design fire protection features is contrary to the NRC's stated goal for the aircraft impact rulemaking to implement "design and other features that could provide additional inherent protection to avoid or mitigate, to the extent practical, the effects of an aircraft impact, with reduced reliance on operator actions." (Beyond Nuclear-3-2.c, Pilgrim Watch-4-2.a)

NRC Response: The commenters' comments on the perceived inadequacy of safety-related fire protection systems in currently operating power reactors and the NRC's plans to address fire protection compliance issues are outside of the scope of this rulemaking. No change was made to the final rule as a result of this comment.

Comment: The proposed rule should apply to all reactors with spent fuel on-site. A study performed by Dr. Jan Beyea in May 2006 showed significant impacts in economic losses and latent cancers due to releases of Cesium-137 from the Pilgrim spent fuel pool, which is but one radioisotope that would be released in a severe accident involving the spent fuel pool. An attack from even a small private plane, if it targeted the spent fuel pool, would cause this level of disaster. It is neither logical nor rational to apply the rule to new reactors with little spent fuel onsite, but to exempt old reactors with tons of spent fuel onsite. (Pilgrim Watch-4-4, 5)

NRC Response: The NRC does not agree that the rule should apply to all reactors with spent fuel on-site, nor with the commenter's implication that the NRC has not addressed the related safety issues for "old reactors with tons of spent fuel onsite." The NRC's basis for not applying the rule to existing operating reactors is outlined in the responses above to the previous comments on this subject. In short, the Commission has addressed aircraft attacks by the ICM Orders dated February 25, 2002, requiring 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 has proposed incorporating the continuing requirement to provide for such mitigative measures in the NRC's regulations in a proposed supplement to the power reactor security requirements proposed rule (73 FR 19443; April 10, 2008). In addition, the final aircraft impact rule requires relevant applicants to assess the effect of the aircraft impact on spent fuel cooling and spent fuel pool integrity. No change was made to the final rule as a result of this comment.

Comment: The proposed rule should be applied to all operating reactors. For example, a GE BWR Mark II plant, located near Boston, is in the flight path of commercial air traffic approaching Logan Airport. NUREG-1738 indicates a 75% likelihood of catastrophic failure of

the spent fuel pool in the event of a direct aircraft hit. In such an event, the Pilgrim Nuclear Power Station (PNPS) emergency plan would confine Cape Codders to their location with no means of timely evacuation. (Cape Downwinders-5-1)

NRC Response: The NRC does not agree that the rule should apply to all operating reactors. The NRC's basis for not applying the rule to existing operating reactors is outlined in the response above to the previous comments on this topic. NUREG-1738 uses conservative assumptions to estimate the potential accident risk in a spent fuel pool at decommissioning plants in the United States. This study was prepared to provide a technical basis for decommissioning rulemaking for permanently shutdown nuclear power plants. Nonetheless, NUREG-1738 estimates the likelihood of significant spent fuel pool damage from aircraft impacts at 1.3×10^{-11} to 6.0×10^{-8} per year. The values the commenter claims to be in NUREG-1738 could not be confirmed. The commenters' comments on the PNPS emergency plan are outside of the scope of this rulemaking. No change was made to the final rule as a result of this comment.

Comment: The proposed rule should apply to all currently operating reactors and "closed" reactors that have irradiated fuel assemblies in onsite pool storage structures. The NRC has not demonstrated, using a 95% confidence level, that currently-operating nuclear power plants provide adequate protection to public health and safety and common defense and security with respect to aircraft attacks. The courts generally require scientific facts to be established to 95% confidence. The NRC has subscribed to this definition, as evidenced by a discussion of a NRC staff member at a September 6, 2001 ACRS meeting (Tr. At 3). However, in this rulemaking, the NRC fails to provide a showing of 95% confidence with respect to the showing of adequate protection for current plants against aircraft impact. (Pilgrim Watch-4-1a)

Comment: The NRC should make available to a panel of independent expert the NRC's basis for determining that there is 95% confidence level that currently operating nuclear power plants provide reasonable assurance of public health and safety and common defense and security against aircraft attacks. A full and complete summary of the studies should be made publicly available, omitting only those portions necessary for security. A workable model of this method of disclosure was provided by the public report issued by the National Academies on spent fuel vulnerability. (Pilgrim Watch-4-1b)

NRC Response: The NRC does not agree that the rule should apply to all operating reactors. The NRC's basis for not applying the rule to existing operating reactors is outlined in the response above to the previous comments on this topic. The NRC also disagrees with the commenter's assertion that the NRC must, as part of this rulemaking, "demonstrate" that currently-operating nuclear power plants provide reasonable assurance to public health and safety at the 95% confidence level. The NRC is not aware of any statutory requirement directing the NRC to use, or demonstrate meeting, a 95% confidence level in making the statutorily-mandated adequate protection finding. The NRC reiterates that it views the impact of a large, commercial aircraft as a beyond-design-basis event. Accordingly, the requirements of the aircraft impact rule are not necessary to make a finding of reasonable assurance of adequate protection to public health and safety. No change was made to the final rule as a result of these comments.

Comment: The aircraft impact rule should not be applied to existing operating plants. The security programs mandated by the NRC's orders, the Design-Basis-Threat rule, and the protection provided by other federal, state, and local entities, provide an adequate level of protection against the effects of aircraft impacts. Further, the industry believes that the rule should not apply to holders of construction permits and plants where construction is substantially complete even if the permit is being renewed because it would be impractical. These plants should be subject to the same requirements as operating plants. However, initial (sic) construction permits would be required to meet the rule, because no construction has started. (NEI-23-3)

NRC Response: The NRC agrees with the commenter that the rule should not be imposed upon existing operating plants for the reasons expressed by the commenter and outlined in responses to the previous comments on this subject. The NRC also agrees with the commenter that the rule should not apply to current holders of construction permits who have not yet completed construction, but that the rule should apply to new construction permit applicants. The NRC has added provisions in the final rule for the rule to apply to construction permits issued after the effective date of the final rule.

B. Applicability to Currently Approved Standard Design Certifications and Combined Licenses Referencing these Certifications

Comment: The NRC should clearly and unequivocally apply the proposed rule on the treatment of aircraft impacts to all designs referenced by a combined license applicant and to all new plants. The public will not understand the distinction that the NRC is attempting to draw between new plants that reference previously-certified designs and new plants that are subject to the proposed rule. The NRC and industry have increased public knowledge and therefore, acceptance of nuclear power after many difficult years. As a result of this increased knowledge, members of the public likely consider protection against a clearly-understood scenario (such as an aircraft impact) to be an important component of any new reactor design. Likewise, the public expects a credible and unambiguous regulator to approve those plant features that are important to safety, including those features that offer protection in the event of an aircraft impact. The public simply will not understand the NRC's logic in distinguishing between previously certified designs and new plants that are subject to the proposed rule, particularly when no new plants have been licensed or constructed. By requiring only a limited subset of anticipated new reactors (less than half of the currently announced plants) to address aircraft impacts as part of the design, the NRC's proposed rule could undermine public confidence in new nuclear power plants. Further, some designs have made the incorporation of significant safety and security features, including those that address aircraft impacts, an objective of the design process in order to ensure greater plant reliability and instill public confidence in this next generation of nuclear plants. This can best be accomplished through a disciplined process imposed by regulation and subject to NRC review. (UniStar-26-4, NC WARN-7-3)

NRC Response: The NRC agrees with the commenters to the extent that they assert that any new nuclear power plant constructed should be required to meet the aircraft impact rule, including those which utilize one of the four currently approved design certifications. As discussed in this statement of considerations for the final rule, under Section III, “Currently Approved Standard Design Certifications and Combined Licenses Referencing These Certifications,” the NRC has decided that all nuclear power plants designed and constructed

after the effective date of the final aircraft impact rule must utilize designs which comply with the aircraft impact rule, including those which reference one of the four currently approved design certifications, which is consistent with the commenter's assertion that all new nuclear power plants *to be constructed* must comply with the aircraft impact rule. However, with respect to the four currently approved design certifications, the NRC has determined that this objective can be achieved by requiring that these designs be updated if either: (1) one of those design certifications is referenced in a combined license; or (2) upon renewal if, at the time or renewal, that design certification has not been amended to comply with the aircraft impact rule.

The NRC believes that market forces will determine whether it is more efficient for the original design certification applicant (or another qualified entity) to re-certify the design as meeting the requirements of the aircraft impact rule or for the individual combined license applicant referencing one of the four existing design certifications to submit an application to amend the design certification or to treat the design as a custom design and submit the design in the combined license application *in toto* without having the benefit of finality and issue resolution. Thus, the NRC disagrees with the commenters to the extent that they suggest that this objective should be achieved by mandating that all four currently approved design certifications be immediately required to meet the aircraft impact rule. The final aircraft impact rule reflects these NRC determinations.

Comment: The proposed rule should apply to all currently approved design certifications. The requirements are necessary in order to ensure adequate protection of the public health and safety. Even if they are not necessary for adequate protection, the NRC should apply the proposed rule to the current design certifications. It would be imprudent for the NRC to allow a reactor to be built with less than the most current, up-to-date safety and security information and technology, such as those discussed in NUREG/CR-1345, "Nuclear Power Plant Design Concepts for Sabotage Protection," inasmuch as the NRC implicitly recognizes that applying the requirements of this rule would enhance overall safety and security of the reactor. Moreover, not applying the rule to currently-approved design certifications would contradict and undermine the objective of the rule. A designer for a new reactor would have significant economic disincentives to adopt potentially advantageous design features, functional capabilities or strategies, inasmuch as the four existing design certifications would not have to reflect the cost of such additional features. (NYS AG-17-2a, UCS-29-2)

NRC Response: The NRC agrees in part with the commenters, to the extent that the commenters assert that all newly designed and constructed nuclear power plants should be required to meet the aircraft impact rule. As discussed in response to the previous comment, and in the statement of considerations for the final rule, under Section III, "Currently Approved Standard Design Certifications and Combined Licenses Referencing These Certifications," the NRC has decided that all newly designed and constructed nuclear power plants must utilize designs which comply with the aircraft impact rule, including those which reference one of the four currently approved design certifications. This NRC's decision is consistent with the commenter's assertion that all new nuclear power plants to be constructed must comply with the aircraft impact rule. However, with respect to the four currently approved design certifications, the NRC believes that this objective can be achieved by requiring these design certifications if either: (1) one of those design certifications is referenced in a combined license; or (2) upon renewal if, at the time or renewal, that design certification has not been amended to comply with the aircraft impact rule.

The NRC agrees with the commenters that the designers of a new reactor may face some economic disincentives to adopt potentially advantageous design features, capabilities or strategies, inasmuch as these could increase the cost of design and the cost of constructing a nuclear power plant based upon the design. However, the NRC believes that these economic disincentives will be offset by market demand for reactor designs that are more robust and have been designed in accordance with the aircraft impact rule. The NRC's views in this regard are reinforced by some of the comments on industry stakeholders, *see UniStar-26-4, GEH-28-1, Westinghouse-31-1*. In any event, the NRC has concluded that the best regulatory approach would be to require these design certifications be required to comply with aircraft impact rule, but only if the design is referenced in a combined license, or if the certification is renewed. Thus, the NRC believes that the final rule achieves the underlying objective of the commenter, but in a less regulatory burdensome manner. The final aircraft impact rule reflects these NRC determinations.

Comment: The proposed rule should apply to all currently approved design certifications. Over 15 years prior to the certification of these designs, the NRC had published NUREG/CR-1345, Nuclear Power Plant Design Concepts for Sabotage Protection (1981). The NRC failed to apply the protective strategies garnered by a Design Study Technical Support Group, which was comprised of representatives of Combustion Engineering, General Electric, and Westinghouse. Thus, known sabotage-resistant enhancements were not incorporated into the current design certifications. The NRC should not compound its mistake in failing to consider this report when certifying the existing designs, by exempting the four current design certifications from the aircraft impact rule. To do otherwise would give the appearance that the NRC is interested more in cost containment for the industry rather than protecting public health and safety and common defense and security. (UCS-29-3, Beyond Nuclear-3-3, Pilgrim Watch-4-6)

NRC Response: The NRC agrees in part with the commenters, in that the final rule requires the four currently approved design certifications to comply with the aircraft impact rule, but only if either: (1) one of those design certifications is referenced in a combined license; or (2) upon renewal if, at the time or renewal, that design certification has not been amended to comply with the aircraft impact rule. As discussed in response to previous comments, and in the final rule statement of considerations, under Section III, "Currently Approved Standard Design Certifications and Combined Licenses Referencing These Certifications," the NRC has decided that all nuclear power plants designed and constructed after the effective date of the final aircraft impact rule must utilize designs which comply with the aircraft impact rule, including those which reference one of the four currently approved design certifications. The final aircraft impact rule reflects these NRC determinations.

The commenter's assertions regarding the NRC's actions with respect to NUREG/CR-1345 and sabotage protection are outside the scope of this rulemaking. No change was made to the final rule as a result of these comments on NUREG/CR-1345.

Comment: The proposed rule should apply to all currently approved design certifications. The NRC's proposal to rely upon voluntary enhancement of the current design certifications is inadequate for protecting public health and safety and common defense and security. "Voluntary" efforts do not work in a timely manner, and are not a substitute for regulatory

requirements. Inasmuch as none of the design certifications have yet to be utilized in a constructed reactor, there is still an opportunity to incorporate changes into the design certifications before construction of a reactor utilizing a certified design, thereby avoiding more expensive retro-fits at a later date. The industry and the NRC have the time and the wherewithal to modify these designs to address aircraft impacts. It the aircraft impact rule is not applied to the currently approved design certifications, potentially as many as seven of the first ten new nuclear plants slated to be licensed by the NRC would not be required to comply with the propose rule. This would further damage the public confidence in the industry and the agency which purports to regulate it. Moreover, even the nuclear industry recognizes this adverse impact on public confidence, as reflected in Westinghouse's proposed change to the AP1000 design certification to line the interior and exterior of the concrete containment with steel plates to increase resistance to aircraft penetration. (NEIS-32-5; Greenpeace-19-2a, 2b)

NRC Response: The NRC acknowledges the commenters' view that public confidence may be damaged if the aircraft impact rule is not applied to future-constructed nuclear power plants. In developing the final rule, the staff concluded 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. The NRC also agrees with the commenters that voluntary efforts to comply with the aircraft impact rule are not an acceptable regulatory alternative to the adoption of a regulatory requirement mandating compliance with the aircraft impact rule, but not for the reasons expressed by the commenters. Instead, the NRC believes that this approach will preserve the level of standardization achieved through certification of these designs, without imposition of undue burdens on any of the original design certification applicants in circumstances where there designs are not likely to be used, as well as leaving to commercial considerations the entity who will actually prosecute the amendment of the design certification to meet the aircraft impact rule. Standardization is thereby enhanced, which is consistent with the Commission's "Policy Statement on Standardization of Nuclear Power Plants" (52 FR 34884; September 15, 1987). Accordingly, as discussed earlier, the NRC has decided to require in the final aircraft impact rule that the four currently approved design certifications to comply with the aircraft impact rule, but only if either: (1) one of those design certifications is referenced in a combined license; or (2) upon renewal if, at the time or renewal, that design certification has not been amended to comply with the aircraft impact rule.

The NRC selected this regulatory approach because it believes that regulatory requirements should be imposed in a manner which preserves standardization while minimizing unnecessary expenditure of NRC and industry resources. It makes little sense for the NRC to require that an existing design certification be updated to comply with the aircraft impact rule if there is little likelihood that the design certification will actually be utilized in the U.S. The NRC believes that the final rule establishes a good regulatory framework for achieving the ultimate objective sought by the commenter, but in a manner which avoids unnecessary expenditure of applicant and NRC resources. The final aircraft impact rule reflects these NRC determinations.
Comment: Terrorist factions come in waves and eventually disappear by arrest, political solutions or societal developments (see urban guerillas in Germany in the 1970s). The current, very dangerous threat is now and may persist in the next 10 to 20 years. Therefore a limitation of the rule to new standard design certifications, etc. is inappropriate, since current COLs are not included. (Schmidt-6-1 - portion)

NRC Response: The NRC interprets the comment as favoring the application of the aircraft impact rule to each of the four existing design certifications, inasmuch as the proposed rule would have not required a combined license referencing one of the four existing design certifications to comply with the aircraft impact rule within the scope of the referenced design. As discussed above, the final rule will require all COLs to comply with the aircraft impact rule, including those that reference one of the four existing design certifications. The NRC believes that the final rule establishes a good regulatory framework for achieving the ultimate objective sought by the commenter, but in a manner which avoids unnecessary expenditure of applicant and NRC resources.

Note: The portion of this comment related to currently-operating plants is addressed in Section III.A, "Applicability to Currently Operating Reactors," of this document.

Comment: Due to the potential for site specific screening based on local topography, the rule should apply to all applicants [for combined licenses] and currently approved design certifications, including the ABWR and AP1000. (Coldren-8-4, 5)

NRC Response: The NRC agrees with the commenter's apparent view that the rule should allow the assessment to consider the potential for site specific screening based upon local topography. The NRC interprets the final aircraft impact rule as allowing construction permit, operating license and combined license applicants to consider local topography in performing the aircraft impact assessment. However, the NRC disagrees with the commenter that design certifications may take cognizance of local topography. By their nature as a generic approval, design certifications neither account for nor address characteristics such as local topography of a specific site. Thus, the NRC disagrees with the commenter that this rationale constitutes a valid basis for requiring existing design certifications to comply with the final rule. No change was made to the final rule as a result of this comment.

Comment: The NRC should, if not imposing the proposed rule on currently approved design certifications, impose the new rule at the time of renewal of the design certifications, as is permitted under 10 CFR 52.59. (NYS AG-17-2b)

NRC Response: The NRC agrees in part with the commenter's suggestion and has included two new provisions in the final rule, 10 CFR 50.150(b)(1)(iv) and an amendment to 10 CFR 52.59(b). Considered together, these two provisions 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 final aircraft impact rule reflects these NRC determinations.

Comment: GE-Hitachi Nuclear Energy, the vendor of the Advanced Boiling Water Reactor (ABWR) design certification, indicated their willingness to assess the ABWR in accordance with the proposed rule, if acceptable commercial arrangements are made with a combined license applicant referencing the ABWR. (GEH-28-1)

NRC Response: No response necessary.

Comment: Westinghouse Electric Co., the vendor of the AP1000 design certification, indicated that they intend to submit an application to amend their design certification and voluntarily

include the airplane crash assessment in the amendment. (Westinghouse-31-1)

NRC Response: No response necessary.

Comment: In addition to the NRC's inherent authority to promulgate rules under the Atomic Energy Act, 10 CFR 52.63(iii), (vi) and (vii) authorize the NRC to impose new requirements on existing design certifications in the present circumstances. Specifically, applying proposed 10 CFR 52.500 to all designs referenced by a combined license applicant would contribute to increased standardization of the certification information. Because no new plants have been constructed and no combined licenses referencing a previously-certified design have been issued, application of proposed 10 CFR 52.500 would increase standardization by avoiding the need for individual combined license applicants to address aircraft impacts (either in individual licensing proceedings or as part of compliance with proposed 10 CFR 73.55). Along these lines, consistent application of the proposed rule would also reduce unnecessary regulatory burden by resolving aircraft impacts issues in a single licensing review for the certified design rather than in numerous combined license reviews. The change would also substantially increase overall safety and security of the design under the same cost-benefit calculus that applied to other design certification applicants. (UniStar-26-5)

NRC Response: The NRC interprets this comment as suggesting that the final aircraft rule require the immediate imposition of rule's requirements to the four currently approved design certifications. The NRC agrees with the commenter that resolving aircraft impact issues in a single design certification amendment proceeding is preferable to resolution of that subject in individual licensing proceedings, because it reduces unnecessary regulatory burden. However, were the NRC to adopt the commenter's implicit proposal for immediate imposition of the rule's requirements on the four currently approved design certifications, this may result in the original applicants of those design certifications which have little or no commercial prospect of being utilized in the U.S. incurring the unnecessary cost of compliance with the aircraft impact rule. The NRC has determined that the final rule's alternative approach is preferable. The final aircraft impact rule provides several procedural alternatives which will result in the NRC's objective being achieved, and which may also be consistent with the commenter's views.

Comment: Section 52.500 (a) should be amended to clarify that COL applicants that are referencing design that was certified before the effective date of the aircraft impact rule should perform the assessment, unless the design entity agrees voluntarily to perform the assessment and submit an amendment to the certified design. (NEI-23-4)

NRC Response: The NRC agrees in part with the commenter that combined license applicants referencing one of the four currently approved design certifications should comply with the aircraft impact rule if the design has not already been amended to comply with the aircraft impact rule. However, the NRC disagrees with the commenter's implicit suggestion that the assessment performed by the combined license applicant should be considered a plant-specific design matter, and therefore be regarded as separate from the referenced design certification. As discussed in the statement of considerations for the final aircraft impact rule, the Commission believes that public confidence, finality considerations, and the NRC's standardization policies favor a regulatory regime whereby all combined licenses, if referencing a design certification, must reference a design certification which complies with the aircraft impact rule. The final aircraft impact rule reflects these NRC determinations, but provides a

number of alternative procedural approaches which will result in the NRC's objective being achieved. The NRC included these alternative approaches to provide flexibility and regulatory transparency to the combined license applicant and the original applicants of the four currently approved design certifications.

Comment: The final rule and corresponding guidance should clarify how the rule applies to non-Light Water Reactor (LWR) designs. Although the Proposed Rule does not specifically address non-LWR designs, the language used in the Proposed Rule does not account for some non-LWR designs. More specifically, proposed 10 CFR § 52.500(c) requires that the evaluation address "containment integrity" and "spent fuel pool integrity." Future reactor designs may not include a "containment" or "spent fuel pool" as those phrases are understood today. For example, future designs may use a "reactor building" instead of the traditional "containment," or may store spent fuel in "storage tanks" instead of in "spent fuel pools." Therefore, the language of the Proposed Rule should be modified to clarify that non-LWR designs must only address these requirements to the extent that they are applicable to the design. Furthermore, the guidance for this rule should provide further clarification of the distinction between LWRs and non-LWRs for purposes of compliance with this rule. (Morgan Lewis-10-7)

NRC Response: The NRC agrees that the language of the proposed rule may not be applicable, in all respects, to future non-LWR designs, and agrees that it would be a possible enhancement to the language of the rule to clarify that the requirements are applicable to those designs only as they are technically applicable. However, the issue of inapplicability of current NRC requirements to non-LWR reactors, in whole or part, is not new and the industry understands that NRC requirements must be reviewed and modified as necessary when applied to non-LWR reactor designs. The language suggested by the commenter does nothing to provide greater clarity or regulatory stability and predictability regarding the design requirements to be applied to non-LWR reactors to address airplane impacts. Accordingly, the NRC declines to adopt the suggested language changes. However, the section-by-section analysis provides the NRC position on this subject, which is consistent with the commenter's position that the specific language of the airplane impact rule may have to be modified when applied to non-LWR reactors.

C. Other Applicability Issues

Comment: The NRC should consider air-based attack scenarios and mitigation strategies in all licensing and relicensing applications before the NRC. (NYS OHS-13-3)

NRC Response: The NRC interprets this comment as suggesting that every license amendment and license renewal proceeding for currently-operating nuclear power plants should address air-based attack scenarios and mitigation strategies beyond those involving a large, commercial aircraft. The NRC disagrees with the commenter's suggestions. The aircraft impact rule's requirement for future nuclear power reactor applicants to perform an assessment of the impact of a large, commercial aircraft, as opposed to other "air based attack scenarios," is based upon the NRC's determination of the adequacy of current nuclear power reactors and the NRC's evaluation of the current and projected threat environment, based upon input from other government intelligence and military agencies. The commenter presented no reason why the NRC's decision in this regard is incorrect or imprudent, and should be expanded in accordance with the commenter's suggestion. Even if the NRC were to agree that currently-

operating plants should be backfit to address a broader set of "air-based attack scenarios," the NRC does not believe that regulatory efficiency, effectiveness, or public confidence would be served by the commenter's approach. This would introduce into every reactor facility licensing proceeding, no matter what or how narrowly focused the subject matter of the licensee's amendment request, the issue of compliance with the aircraft impact rule. The NRC has never utilized such a regulatory approach – save initial licensing, which is not relevant here with respect to currently-operating reactors. Therefore, for the reasons set forth above, the NRC declines to adopt the commenter's proposal. No change was made to the final rule as a result of this comment.

Comment: If the current 104 reactors are not going to be backfit, then why would we financially penalize any new reactors? This regulation has to apply to all or none. You cannot be half-pregnant on this issue. I recommend that this regulation apply to none rather than all. (Halac-1-5)

NRC Response: The NRC does not agree with the commenter that the NRC must decide between applying new requirements on both new and existing reactors or applying them to none. There is no statutory requirement that all reactors be subject to the same set of regulatory requirements. As the NRC has articulated in several other contexts – perhaps most notably in the statement of considerations for the license renewal rule (56 FR 64943; December 13, 1991) – the NRC may apply different requirements to different reactors depending upon the time period in which they were first licensed. Id. At 64950 (second and third columns).

As far as "financially penalizing" new reactors, the NRC points out that the resources expended by applicants for new nuclear power reactors in complying with the aircraft impact rule will result in tangible and intangible benefits. By requiring a systematic, disciplined and rigorous review of aircraft impacts and possible design improvements at the design stage, future plant designers and the operators of the plants will become more aware of the strengths and vulnerabilities of the design. Presumably, some practical design features and functional capabilities to avoid or mitigate the effects of an aircraft impact will be incorporated into the design. In addition, operators of nuclear power plants will be able to develop operational and response procedures which take into account the strengths and vulnerabilities of their design. This should further increase the level of safety and security for these plant designs. No change was made to the final rule as a result of this comment.

Comment: What about on-site, above-ground, used-fuel, storage facilities? How are these being protected? (Halac-1-8)

NRC Response: The commenter's comment on on-site, above-ground, used-fuel storage facilities is outside of the scope of this rulemaking. NRC's requirements regarding independent storage of spent nuclear fuel are contained in 10 CFR Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste." No change was made to the final rule as a result of this comment.

IV. Adequate Protection, and Consideration of Aircraft Impacts as a "Beyond-Design-Basis" Event

Comment: It is the appropriate regulatory treatment to consider the impact of a large, commercial aircraft as a beyond-design basis event. Such an assessment and an evaluation of design alternatives to address such a beyond-design basis event is consistent with the NRC's "Policy Statement on Severe Reactor Accidents Regarding Future Designs and Existing Plants," published at 50 Fed. Reg. 32,138 (Aug. 8, 1985), and the "Policy Statement on the Regulation of Advanced Nuclear Power Plants," (July 8, 1986). (NEI-23-1; AREVA NP-15-1.b)

NRC Response: The NRC agrees with the commenter that the aircraft impact rule's requirements governing an assessment of aircraft impacts and the treatment of impact of a large commercial aircraft as a beyond-design-basis event is consistent with the policy statements cited by the commenters. No change was made to the final rule as a result of this comment.

Comment: The NRC's determination that the impact of a large, commercial aircraft is a beyond-design threat is arbitrary and capricious. The public does not care whether the threat to nuclear facilities comes from terrorists or nation-states, or the manner in which the reactor is attacked. The events of September 11, 2001 changed the threat environment for nuclear reactors, and the NRC should recognize that change and require new nuclear reactors to be constructed be designed to defend against airline attacks. The NRC has previously altered its position and increased the design basis threat; an example would be the modification of the design basis threat to include truck bombs, which resulted from the efforts of the Committee to Bridge the Gap and the Nuclear Control Institute. (Greenpeace-19-1)

NRC Response: The NRC agrees with the commenter that new nuclear power plants (facilities) should be designed to withstand the impacts of a large commercial aircraft, and the final aircraft impact rule requires all newly designed and constructed facilities to comply with the rule's requirements. However, the NRC disagrees with the commenter's assertion that the aircraft impact must be treated as a design basis threat (DBT). This was the subject of a separate NRC rulemaking which was finalized in 2007 (72 FR 12705; March 19, 2007). The commenter presented no new information or rationale which would cause the NRC to re-examine its previous determination that the large commercial aircraft impacts should not be regarded as design basis threat events. Any such re-examination, in any event, is outside the scope of this rulemaking, which does not focus on security programs (the only area where the definition of the DBT would have any regulatory impact), but instead is focused on facility design. Accordingly, the NRC declines to adopt the commenter's suggestion. No change was made to the final rule as a result of this comment.

Comment: The commenter incorporates by reference the material in a petition for rulemaking filed by the commenter seeking to amend the NRC's regulations governing the design basis threat (DBT) to require protection against air attack (PRM-73-12). (CBG-22-1)

NRC Response: The NRC declines to reconsider the information in the document referenced by the commenter. The NRC recently denied the petition for rulemaking filed by the commenter as part of the NRC's final rulemaking amending 10 CFR Part 73 with respect to the DBT (72 FR 12705; March 19, 2007). The commenter did not provide any explanation why the

NRC's determination of the petition was incorrect or should be changed for significant new information not previously known at the time of the denial. For these reasons, the NRC declines to reconsider the information contained in the commenter's previously-filed petition. No change was made to the final rule as a result of this comment.

Comment: Aircraft impacts from commercial and military aircraft should be considered a design basis threat. (NEIS-32-7b)

NRC Response: The NRC does not agree with the commenter, for the reasons articulated in the NRC's final Design Basis Threat (DBT) rulemaking (72 FR 12705; March 19, 2007) and previous NRC responses to comments on this issue. The commenter does not present any new arguments or information that would cause the NRC to revisit its determination in this regard. In any event, the issue of inclusion of an aircraft attack and impact in the DBT, which is a physical security matter, is separate from the focus of this rulemaking, which is focused on design. No change was made to the final rule as a result of this comment.

Comment: It is no longer reasonable for a licensee to defend a nuclear power plant with only a private security force. Licensees should be required to contract services for a fee from the U.S. military or the National Guard, since Guard units are already an integral component of emergency response and evacuation plans. (NEIS-32-1)

NRC Response: The NRC declines to adopt the commenter's suggestion. The NRC has no authority to require its licensees to enter into such a contractual arrangement with the U.S. military or units of the National Guard. It is also unclear whether the U.S. military may provide such services (security against air attack) within the U.S. under current statutory restrictions. No change was made to the final rule as a result of this comment.

Comment: The NRC did not resolve the problem of aircraft attacks against currently operating plants, inasmuch as the NRC orders directing licensees to develop and adopt strategies to cope with large fires and explosions deal with after-the-fact controls, not with "avoidance or mitigation." This is akin to the NRC no longer requiring a containment if a licensee had an adequate emergency evacuation plan in place. (NEIS-32-2)

NRC Response: The NRC disagrees with the commenter, inasmuch as its analogy is not valid. In the final aircraft impact rule, the NRC has concluded that existing nuclear power plant facilities need not be *augmented* by performing an assessment to consider the addition of *new* design features and functional capabilities over and above those already provided. This is not the same as the commenter's analogy of the NRC *removing* an existing requirement for a design feature – the containment – which is currently part of the facility.

In any event, the NRC directs the commenter to the rationale expressed in the statement of considerations for the final aircraft rule as to why current nuclear power plant facilities need not be subject to the aircraft impact rule and to the NRC responses to comments on this topic in Section III.A of this document. No change was made to the final rule as a result of this comment.

Comment: The NRC's view that the protection afforded by other Federal, State and local entities, provides an adequate level of protection to public health and safety and common

defense and security against aircraft impacts, is not defensible, in light of:

(1) An October 18, 2007 Tribune article showing that Transportation Security Administration (TSA) airport screeners at O'Hare International Airport (IL) failed to detect 60% of simulated explosives hidden in carry-on bags or the clothing of undercover agents working for TSA, and a 75% failure rate for TSA screeners at Los Angeles International Airport (CA).

(2) A November 30, 2007 Associated Press story indicating that the Bush Administration intends to slash counterterrorism funding for police, firefighters and rescue departments.

(3) *An October 17, 2007 Associated Press story indicating that the US Department of Defense ("the Pentagon") will alert eight National Guard units that they will be deployed to Iraq or Afghanistan in summer 2008, and that this will have a significant adverse effect in Illinois, because National Guard units are relied upon in the Illinois Radiological Emergency Response Plan to provide radiological emergency response. (NEIS-32-7a)*

NRC Response: The NRC agrees with the commenter that the NRC's determination that aircraft impacts from a large, commercial aircraft need not be considered a design basis accident, should not be premised upon the actions of other federal agencies and governmental entities. The NRC has determined that adequate protection to the public from aircraft impacts is provided by the series of orders which the NRC issued following September 11, 2001, which will be codified in a series of rulemakings which the NRC has initiated, some of which have been adopted in final form, e.g., the DBT Rule. Thus, compliance with NRC requirements is sufficient to provide adequate protection to public health and safety. The statement of considerations for the final rule has been modified to remove the reference to NRC's reliance upon the actions of other federal agencies and governmental entities.

However, the NRC disagrees with the commenter that three news stories cited by the commenter provide evidence that the actions of other federal agencies and governmental entities have been inadequate in reducing the possible threat of aircraft impacts. The first news story, which asserts that TSA airport screeners had a relatively high failure rate for detection of explosives hidden in carry-on bags or clothing, may be irrelevant to the protection of existing (or future) nuclear facilities from commercial aircraft impacts. A carry-on bomb would not add appreciably to the impact effects of a large, commercial aircraft on a nuclear power plant. Moreover, a bomb exploded in-flight would prevent that aircraft from impacting the plant. Hence, even if one assumes the news story to be true, it does not affect the NRC's determination with respect to adequate protection of existing nuclear power plants.

The second and third news stories, at most, deal only with post-terrorist incident response by local units of government or the National Guard. The commenter did not demonstrate whether either funding cuts or National Guard deployments overseas would affect local government entities or the National Guard from responding to and providing assistance to nuclear power plant licensee/operators in response to an aircraft attack at a nuclear power plant such as fire control or potential evacuation – matters for which licensees already have arrangements with local entities. Moreover, local entities would not ordinarily have primary responsibility for preventing an aerial attack against a nuclear power plant. The National Guard's aerial units do provide, in some circumstances, protection against aerial attack, but the news story cited by the

commenter did not provide a reasonable basis for concluding that the National Guard either has responsibility for, or would be unable to respond to a request for, assistance involving a confirmed aircraft attack in progress at a nuclear power facility.

In sum, the NRC concludes that the three news stories do not provide sufficient basis to prevent the NRC from concluding that there is reasonable assurance of adequate protection against aircraft attacks. No change was made to the final rule as a result of this comment.

Comment: Nuclear power plants are critical infrastructure targets. The consequences of a successful attack could be far reaching with unacceptable consequences. Malicious use of an aircraft to cause damage to a nuclear power plant cannot be determined through a probabilistic approach, because such acts are intentional and must be considered as pre-meditated acts by intelligent adversaries who are looking to exploit vulnerabilities to cause as much damage as they can. Such actions must be anticipated and addressed by deterministic means, and vulnerabilities determined and effectively addressed. (Pilgrim Watch-4-2.b)

NRC Response: The NRC agrees with the commenter that nuclear power plants are critical infrastructure targets for terrorists and other persons of malevolent intent. The NRC also agrees that malicious use of an aircraft may not be determinable through a probabilistic approach. These are some of the reasons why the NRC believes it is prudent for nuclear power plant designers to take into account the potential effects of the impact of a large, commercial aircraft to identify practical design features and functional capabilities that could provide additional inherent protection to avoid or mitigate the effects of an aircraft impact. The aircraft impact rule should result in new nuclear power reactor facilities being more inherently robust regarding an aircraft impact than if they were designed in the absence of this final rule. No change was made to the final rule as a result of this comment.

Comment: The proposed rule, by foregoing passive air defense to frustrate or prevent air attacks, violates the statutory requirement in 42 USC 2201(i)(3) that regulations governing the design of nuclear facilities maximize protection of life and property. The NRC's "enemy of the United States" rule, 10 CFR 50.13, does not permit leaving passive air defenses out of the proposed rule's requirements. The statutory obligation to maximize protection of life and safety overrides the regulation. Second, the enemy of the United States rule is a justification for leaving air attacks out of the Design Basis Threat, a regulation which is not under consideration in this proceeding. Finally, if an aircraft crash qualifies as a threat that the enemy of the state rule allows licensees to ignore, then there is no authority for the NRC to require aircraft impact assessments. (Northern Lights-18-7)

NRC Response: The NRC disagrees with the commenter's contention that Section 161.i.(3), 42 USC 2201(i)(3), requires that the NRC's regulations governing design of nuclear facilities "maximize" protection of life and property. On the contrary, the statue provides that the NRC has the authority to "prescribe such regulations as [the NRC] *may deem necessary*…(3)..to govern any activity [authorized under the Atomic Energy Act]…*in order to protect public health and to minimize danger* to life or property (emphasis added)." There is no statutory direction to "maximize" protection to life or property. Thus, the NRC disagrees with the commenter's view that Section 161.i.(3) "overrides" the NRC's rule in 10 CFR 50.13 governing "enemies of the state." Finally, the NRC believes that the commenter misunderstands the NRC's position on the relationship between § 50.13 and the aircraft impact rule. The NRC believes that the

aircraft impact rule is not directed at “enemies of the state,” for which design features need not be provided under § 50.13. Rather, the NRC is focused on aircraft impacts, regardless of whether they are intentional or unintentional, and regardless of the place of origin of the individuals or entities who may engage in such attacks. No change was made to the final rule as a result of this comment.

Comment: Has the NRC considered no-fly zones and/or anti-aircraft guns for physical security protection? That would seem much more beneficial for reducing the probability of radiological releases. Let’s make the operators terrorist killers. (Halac-1-10)

NRC Response: The NRC agrees with the implicit assumption that appears to underlie this comment that nuclear power plant licensees should be able to respond with lethal force in appropriate circumstances against persons attacking their licensed facility. With respect to the commenter’s query about no-fly zones for physical security, the federal government has not implemented no-fly zones around nuclear power plants. Permanent flight restrictions around nuclear power plants with sufficient standoff to allow for recognition of an attack and timely response with deadly force would have a significant adverse impact on air transportation in most of the country without a concomitant reduction in risk.

The NRC has considered the subject of licensees’ use of anti-aircraft weaponry to protect their facilities against aerial attacks in its recent DBT rulemaking (72 FR 12705; March 19, 2007). As the NRC has repeatedly stated, it is unreasonable at this time to expect private licensees to deploy weaponry which ordinarily are only obtainable and used by the military and intelligence agencies. Such weapons would raise significant command and control concerns in the hands of a private security force and a large potential for unintended consequences and collateral damage if such weaponry were deployed. Furthermore, requirements regarding the use of anti-aircraft guns relate to the subject of physical security (operational) programs, and not to the design of the facility. Therefore, the commenter’s implicit suggestion that the NRC consider requiring the use of anti-aircraft weaponry is outside the scope of this rulemaking. No change was made to the final rule as a result of this comment.

V. Airplane Characteristics

Comment: The general description of the airline characteristics that should be used in the assessment is adequate. The NRC has made a prudent choice of aircraft characteristics: a large, commercial aircraft of a type used for long distance flights in the United States. Additionally, the assessment should consider aviation fuel loading typically used for such flights. AREVA NP also supports the provision the Commission's proposal that the impact speed and angle of impact should be based 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. Similarly, AREVA NP supports that the choice of aircraft characteristics and the scenario used for the analysis should not be linked to threat assessments or to any evolution of aircraft design. (AREVA NP-15-3; NEI-23-6)

NRC Response: No response necessary.

Comment: The NRC describes the aircraft to be used as the basis for impact assessments in

only the most general terms. (Northern Lights-18-2)

NRC Response: The final aircraft impact rule describes the aircraft as a "large, commercial aircraft" and sets forth a description of the aircraft characteristics as 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. Beyond these general characteristics, the Commission will specify for plant designers in a Safeguards Information (SGI) guidance document more detailed parameters of the large, commercial aircraft impact that are considered appropriate for use in the required assessment. Although the detailed aircraft impact parameters will be described in an SGI guidance document and will not be publicly available because of their potential value to terrorists, the description of some of the factors used in selecting the parameters have been included in the proposed and final rules to foster a better understanding of this rulemaking.

The aircraft specified by the NRC is based on NRC studies since September 11, 2001, to determine the characteristics and effects of aircraft impacts on existing and new nuclear power plants. The staff reviewed the results of the attacks on the World Trade Center and the Pentagon on September 11, 2001, in regards to the aircraft used by the terrorists. The NRC studied the type, number, and characteristics of commercial aircraft flown in U.S. airspace. Collaboration with other Federal Government agencies was crucial in selecting realistic threat parameters. The NRC has also communicated with the regulatory authorities in other countries to understand their requirements and aircraft characteristics used for impact assessments. The NRC has used these reviews in its studies for operating and new reactors and to inform its decisions regarding the characteristics of the large, commercial aircraft to be assumed in the required assessment. No change was made to the final rule as a result of this comment.

Comment: It is unclear whether the proposed rule requires the assessment of the impact of a large aircraft filled with explosives, or multiple small aircraft filled with explosives. (Halac-1-3)

NRC Response: The proposed rule does not require the assessment of the impact of a large aircraft filled with explosives, or multiple small aircraft filled with explosives. No change was made to the final rule as a result of this comment.

Comment: The proposed rule requirement to require consideration of a commercial aircraft is too narrow, and should be modified to include consideration of smaller aircraft (e.g., smaller jet aircraft and general aviation aircraft). A General Electric study and the Indian Point Probabilistic Safety Study recognize that small aircraft can cause significant damage to a nuclear power plant. A small private aircraft carrying explosives could have greater adverse effects than a commercial aircraft. Also, highly maneuverable radio controlled aircraft carrying high explosives could match the damage of commercial aircraft and do it with pin point accuracy at virtually any angle of impact. (NYS AG-17-4; TMI Alert-12-7)

Comment: The proposed rule should require consideration of the impacts from one, as well as multiple simultaneous and/or successive impacts of private aircraft laden with fuel and explosives. Private aircraft are not subject to any of the enhanced protective actions implemented in the commercial aircraft industry, such as increased passenger and cargo

screening. Such private aircraft may be enhanced to become improvised explosive devices, and can be coordinated in simultaneous and/or successive attacks. A large percentage of nuclear power reactors are located within close proximity (10 miles) of airports and airfields from which such planes may be based. The close proximity precludes early detection through falsified flight plans and timely protective action by authorities – including the National Guard. (Beyond Nuclear-3-4.h, Pilgrim Watch-4-14)

NRC Response: The NRC disagrees with these comments. The aircraft impact characteristics specified by the NRC are based on NRC studies since September 11, 2001, to determine the characteristics and effects of aircraft impacts on existing and new nuclear power plants. The staff reviewed the results of the attacks on the World Trade Center and the Pentagon on September 11, 2001, in regards to the aircraft used by the terrorists. The NRC studied the type, number, and characteristics of commercial aircraft flown in U.S. airspace. Collaboration with other Federal Government agencies was crucial in selecting realistic threat parameters. The NRC has also communicated with the regulatory authorities in other countries to understand their requirements and aircraft characteristics used for impact assessments. The NRC has used these reviews in its studies for operating and new reactors and to inform its decisions regarding the characteristics of the large, commercial aircraft to be assumed in the required assessment. As stated previously, the proposed and fnal rules do not require the assessment to consider an aircraft filled with explosives. No change was made to the final rule as a result of these comments.

Comment: By including the consideration of the "angle of impact," the NRC is allowing too much "wiggle room" for deign considerations to fully account for deliberate aircraft attacks. Specifically, the blast effects of an explosive laden aircraft are of equal concern or even more consequence than the proposed rule's impact effects where "angle of impact" is referenced. "Angle of impact" considerations serve to weaken the rule and should not be included in assessments. (TMI Alert-12-8)

NRC Response: The NRC disagrees with this comment. As previously stated, the NRC has determined that design changes for new reactors, resulting from an assessment of a large commercial aircraft impact, provides an enhanced level of protection beyond the existing adequate protection requirements which all operating power reactors are required to meet. The angle of impact is only one factor to consider in performing the assessments. The assessment should model the structural response, shock and vibration effects, and fire effects of the aircraft impact. The assessment should consider both local and global (plant-wide) structural behavior, as well as thermal effects resulting from fire and evaluate shock and vibration effects resulting from the aircraft impact. The fire assessment should consider the extent of structural damage and aviation fuel deposition, if any, spread within the impacted buildings and both short- and long-term fire effects. The plausible angle of impact was characterized through discussions with other U.S. and foreign government agencies and aircraft industry representatives. The NRC conducted interviews with pilots and studied flight simulations to assess the potential skill of a terrorist to strike at selected low altitude nuclear power plant locations. The proposed rule sets forth the 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. The NRC believes that inclusion of these factors in the assessment will strengthen the assessment. Also, as stated previously, the proposed and final rules do not require the assessment of the impact of an aircraft filled with explosives. No change was made

to the final rule as a result of this comment.

Comment: The proposed rule should require that an analysis be conducted with an aircraft of 395,000 pounds, a speed of 590 miles per hour and a fuel load of 10,000 gallons and an angle of attack of up to 25 degrees. Considering the 9/11 attackers were able to hit the first floor of the Pentagon, this fact provides ample evidence that aircraft of this size and speed can strike structures with a low profile. As reported in the American Society of Civil Engineers report on the Pentagon building performance, the plane that struck that building had a weight of 180,000 pounds at impact, with a speed of 530 miles per hour, with roughly 5000 gallons of fuel at impact. The planes that struck the World Trade Center buildings were reported by the Federal Emergency Management Agency in their May 2002 report as traveling 470 mph and 590 mph and caring roughly 10,000 gallons of fuel. Public reports list the maximum takeoff weight of a Boeing 767 as roughly 395,000 pounds. The angle of attack should be restricted to 0 to 25 degrees which is consistent with published studies on the performance parameters of aircraft of this type. (Coldren-8-2.c)

NRC Response: The NRC disagrees with this comment and with the general concept that the aircraft impact rule should provide specific, detailed aircraft impact characteristics. The NRC has a long history of promoting openness in its regulatory and decision-making processes. However, in protecting our Nation, the NRC remains diligent in preventing terrorists from gaining access to sensitive information. Consequently, the NRC must balance its commitment to openness with the need to prevent releases of sensitive information. Beyond the general characteristics of the large commercial aircraft that must be used in the required assessment, the Commission will specify for plant designers in a Safeguards Information (SGI) guidance document more detailed parameters of the large, commercial aircraft impact that are considered appropriate for use in the required assessment. Although the detailed aircraft parameters will be described in an SGI guidance document and will not be publicly available because of their potential value to terrorists, the description of some of the factors used in selecting the parameters have been included in the proposed rule to foster a better understanding of this rulemaking. Also see the response to previous comment *Northern Lights-18-2*. No change was made to the final rule as a result of this comment.

Comment: The NRC should, consistent with other transportation hazards, require the nuclear power plant designer to forecast the relevant aircraft parameters of size, speed, and angle of attack at the end-of-life of the license. This should be done in a realistic fashion and the parameters should be forecast considering current trends in the industry. Specifically, speed and weight should be considered together such that the forecasted weight of a large commercial aircraft in the year 2050 is not applied to the speed of a small corporate jet. (Coldren-8-3)

NRC Response: The NRC disagrees with this comment. The NRC has determined that the impact of a large, commercial aircraft is a beyond-design-basis event. This new proposed rule to address the capability of new nuclear power reactors relative to a potential aircraft impact is based both on enhanced public health and enhanced safety and common defense and security but is not necessary for adequate protection. Rather, it would be to enhance the facility's inherent robustness at the design stage.

The NRC has studied the types, numbers, and characteristics of commercial aircraft flown in

U.S. airspace. The NRC has determined that because this rule is intended to provide added features to avoid or mitigate the effects of a beyond-design-basis event, the choice of aircraft characteristics and the scenario used for this analysis will not be linked to threat assessments or to any evolution of aircraft design. It would be speculative and of questionable value to attempt to forecast aircraft in use at the end-of-life of the license. The NRC has the authority to reassess the aircraft impact characteristics in the future if it believes a change to the threat environment or other factors warrant such reconsideration. No change was made to the final rule as a result of this comment.

Comment: The proposed rule's airplane characteristics should be based upon larger commercial aircraft that fly intercontinental routes. Such aircraft are significantly larger that those on domestic routes, e.g., Boeing 747-ER as compared with a Boeing 767 or 737. Inasmuch as sixty nuclear power plants are located on or near the coast and at risk of being hit by such intercontinental aircraft, maximization of security improvements requires the security assessments to be based upon planes with 747-like characteristics. (Northern Lights-18-5)

NRC Response: The NRC disagrees with this comment. This new rule to address the capability of new nuclear power reactors relative to a potential aircraft impact is based both on enhanced public health and safety and common defense and security but is not necessary for adequate protection. The NRC has studied the types, numbers, and characteristics of commercial aircraft flown in U.S. airspace. The NRC has determined that because this rule is intended to provide added features to avoid or mitigate the effects of a beyond-design-basis event, the choice of aircraft characteristics and the scenario used for this analysis will be based on large commercial aircrafts typically used for long distance fights in the United States. Also see the response to comments *Northern Lights-18-2* and *Coldren-8-2.c*. No change was made to the final rule as a result of this comment.

Comment: To maximize the increase in security possible from assessing air attack threats, the proposed rule must take into consideration changes in the air attack threat and commercial aircraft developments. To freeze the aircraft impact characteristics is inconsistent with the statutory requirement for regulations to maximize security for life and property [identified in another comment as 42 USC 2201(i)(3)]. Characteristics of commercial aircraft in use are likely to change over time. The rule must provide for periodic reexamination of the assessment aircraft characteristics and modification of the characteristics when a significant change in the air attack threat is identified. (Northern Lights-18-6, Halac-1-7)

NRC Response: The NRC disagrees with this comment. This new rule to address the capability of new nuclear power reactors relative to a potential aircraft impact is based both on enhanced public health and safety and common defense and security but is not necessary for adequate protection. The NRC has studied the types, numbers, and characteristics of commercial aircraft flown in U.S. airspace. The NRC has determined that because this rule is intended to provide added features to avoid or mitigate the effects of a beyond-design-basis event, the choice of aircraft characteristics and the scenario used for this analysis will not be linked to threat assessments or to any evolution of aircraft design. The rule requires that the design-specific impact assessment use the Commission-specified aircraft characteristics. Also see the response to previous comments *Northern Lights-18-2*, *Coldren-8-2.c,* and *Northern Lights-18-5*. No change was made to the final rule as a result of this comment.

VI. Aircraft Impact Assessment

Comment: Dry cask storage areas should be considered as part of the assessment of the effects from large, commercial aircraft impacts. (NYS OHS-13-2)

NRC Response: The NRC disagrees with this comment. The scope of this rule is limited to new nuclear power reactors under 10 CFR Parts 50 and 52 and does not apply to dry cask storage facilities licensed under 10 CFR Part 72. As with new power reactors, current requirements for dry cask storage facilities provide adequate protection of the public health and safety and the common defense and security. No change was made to the final rule as a result of this comment.

Comment: The aging process of nuclear plants and the changes that occur due to time, and exposure to very high heat, corrosive and radioactive substances should be taken into account when considering the vulnerability of the plant to aircraft impacts. (Rivard-24-1)

NRC Response: The NRC disagrees with this comment. The NRC has determined that the requirement for assessment of large, commercial aircraft impacts is not an aging-related matter. The safety related equipment and components at a nuclear power plant are housed in robust concrete and steel structures. The NRC has done extensive research to determine the effects of aging and impact of environmental conditions present at a nuclear power plant on these structures. The results of these studies indicate that the load carrying capacity of these structures is not degraded significantly due to aging. In fact, the load carrying capacity of concrete structures increases with time. In addition, the aircraft vulnerability assessment requirements specified by the NRC, including loads from a large commercial aircraft, are sufficiently conservative to offset any small decrease in load carrying capacity of steel structures due to any detrimental aging effects. No change was made to the final rule as a result of this comment.

Comment: The commenter disagrees with the NRC's view that the assessment of large, commercial aircraft is not an aging-related matter. Reactor components age, and such progressive aging does not leave them in better, more durable or "robust" condition from the standpoint of metallurgy or functionality. Aircraft impacts would introduce unanticipated vibrations, forces and effects on already-aging and stressed components. The NRC should rethink the synergies between component aging and aircraft impacts. (NEIS-32-6)

NRC Response: The NRC generally agrees with the commenter's implicit assertion that aging of long-lived reactor components may result in some reduction in their capability to withstand the effects of an airplane impact. Furthermore, the NRC agrees with the commenter's apparent position that a renewal review will include a review as to whether the aging of long-lived passive structures, systems, and components identified by the designer as a result of the aircraft impact rule is adequately managed during the renewal term. However, the NRC wishes to make clear that the occurrence of such aging does not transforms aircraft impacts into an aging-related matter, such that the aircraft impact assessment and evaluation must be re-performed at the time of license renewal. This follows from the objective of, and bases for, the license renewal review under 10 CFR Part 54. The objective of the renewal review under 10 CFR Part 54 is to ensure that there is a regulatory review at license renewal of those matters for which the NRC's ongoing regulatory processes during the term of the operating license, if continued into the

renewal period, would be insufficient to ensure adequate protection to public health and safety and common defense and security. As a result of the 1991 and 1995 license renewal rulemakings (56 FR 64943 and 60 FR 22461, respectively), the NRC determined that, as a result of the NRC's regulatory processes, there were only two areas for which the regulatory process would be insufficient for assuring adequate protection throughout the extended period of operation, *viz*., aging of certain long-lived passive components, and safety issues whose analyses were time limited to address only the current operating term. Aircraft impact is not an aging issue *per se*. Thus, the license renewal review should focus only on whether the long-lived SSCs identified by the designer as a result of the rule will continue to be effective throughout the extended period of operation.

Comment: The proposed rule should be expanded to require consideration of possible weakening of containment of all nuclear power plant sites due to hurricanes, tornados, and/or earthquakes over time and/or structural deficiencies. Component erosion has resulted in long down times and costly investments at most aging nuclear plants. The NRC cannot reasonably assure the public that similar erosion issues have not and will not weaken structures at nuclear power plants. If structures are weakened at existing reactors, the probabilistic risk assessments that the NRC has assumed will protect the public may be inaccurate. (A4NR-9-1; Sierra-20-1)

NRC Response: The matters raised by the commenters deal with aging of structures, systems, and components, their vulnerability to severe natural phenomena, and the relationship of these issues to probabilistic risk assessments for existing reactors. All of these issues are outside the scope of this rulemaking. No change was made to the final rule as a result of this comment.

Comment: The proposed rulemaking needs to incorporate the comprehensive treatment of the overall hazard to include not only the impact phenomena of aircraft or aircraft missiles on substantial concrete structures but also on all potentially affected systems, structures and components. For example, aircraft impact and the resulting concussion on significant concrete structures can cause the chatter of electrical relay switches leading to the inoperability of safety-related equipment or the spurious operation of equipment that interferes with safety-related functions. The proposed rule needs to assess and safeguard against such chains of events involving non-hardened plant systems and structures such as the switchyard and the turbine hall which could lead to severe accident consequence. (Beyond Nuclear-3-4.c, Pilgrim Watch-4-9)

NRC Response: The NRC agrees that the aircraft impact assessment should evaluate the structural response, shock and vibration effects (including relay chatter effects), and fire effects of the aircraft impact on all potentially affected systems, structures, and components. The key safety functions required to be evaluated in the aircraft impact assessment include core cooling, containment integrity, spent fuel cooling, and spent fuel pool integrity. Evaluation of the survivability of these functions should consider not only the key components but also power supplies, cable runs, and other components that support these functions. The final rule statement of considerations addresses these issues.

Comment: The assessment must consider all real consequences of aircraft impact including the spread of transient combustibles (principally aviation fuel) and the simultaneous occurrence of fire in multiple fire zones. Accompanying the high energy impact of the aircraft on the World

Trade Center Tower was the release of nearly 22,000 gallons of partially vaporized aviation fuel that erupted into a fireball. In the case of an aircraft attack on a nuclear power plant, vaporized and unburned fuel would be rapidly forced by expanding flame and pressure fronts into multiple fire zones through breaches in walls, cable tunnels, conduits, pipes and floor drainage systems into multiple areas of the plant followed by combustion. As seen in the case of the World Trade Center fire, ten floors of each of the structures were so intensely burning that steel support structures buckled followed by the progressive collapse of the entire structure; the South Tower collapse in less than one hour of impact. Even relatively small penetrations as the result of rigid projectiles off of the aircraft would allow aviation fuel to flow into containment and from one fire zone to another. NUREG-2859 calculates that 500 pounds of aviation fuel, or roughly 76 gallons, can create the blast equivalent of 1000 pounds of TNT. (Beyond Nuclear-3-4.e, Pilgrim Watch-4-11)

NRC Response: The NRC agrees that the assessment must consider all real consequences of aircraft impact including the spread of aviation fuel and the simultaneous occurrence of fire in multiple fire zones, if applicable. The NRC also agrees that the fire assessment should consider an appropriate amount of aviation fuel deposition, and spread within the impacted buildings. The assessment should consider both short- and long-term fire effects. The potentially important fire effects and fire-related phenomena to be considered for fires following an aircraft impact are the effect of fireball-induced overpressures on barriers separating safety divisions and the effect of fire-induced heat fluxes, temperatures, and products of combustion, e.g., smoke and toxic gases. Also see the response to the previous comment *(Beyond Nuclear-3-4.c, Pilgrim Watch-4-9).* No change was made to the final rule as a result of this comment.

Comment: The rulemaking must clearly require the aircraft impact assessment to explicitly consider potential consequences from smoke and consequential equipment actuations and/or failures. The proposed rule's statement of considerations does not clearly require the aircraft impact assessment to consider all real consequences of an aircraft impact. The statement of considerations states that assessments must consider thermal effects from fire, and the fire assessment to consider structural damage and aviation fuel deposition, but does not refer to other real consequences such as the effect of smoke on equipment (e.g., operability of safety equipment) and personnel (e.g., reduced operator response times). Smoke can cause damage to safety-related equipment and can impede recovery operations (UCS-29-5, Beyond Nuclear 4.f, Pilgrim Watch-4-12)

NRC Response: The NRC agrees that the aircraft assessments should consider the potentially important fire effects and fire-related phenomena following an aircraft impact including the effect of fire-induced heat fluxes, temperatures, and products of combustion, e.g., smoke and toxic gases, but does not agree that this information needs to be included in the statement of considerations. This level of detail is more appropriate for guidance documents on how to perform the assessment. Also see the response to previous comments *Beyond Nuclear-3-4.c, Pilgrim Watch-4-9* and *Beyond Nuclear-3-4.e, Pilgrim Watch-4-11*. No change was made to the final rule as a result of this comment.

Comment: The Riera functions, the loading functions, and the explicit aircraft impact models should be standardized, in order to ensure that all plants are evaluated in a similar manner. (Weidlinger-16-1)

NRC Response: The NRC agrees with this comment. The NRC is considering endorsement of the assessment methods developed by NEI in a regulatory guide that will also include the SGI aircraft impact parameters that the NRC expects applicants to use in their assessments. This will support the standardization of the assessment methodology. No change was made to the final rule as a result of this comment.

Comment: If the impact is into a "soft" facility, then an explicit aircraft model should be required inasmuch use of a Riera function would be meaningless. (Weidlinger-16-2)

NRC Response: The NRC disagrees with this comment. A load-time forcing function such as the Riera loading function as described in the Commission-specified aircraft impact paramenters can be used to simulate the impact load from the aircraft impact even for a "soft" facility. However, a detailed explicit analytical model of an aircraft can also be used to simulate the aircraft directly impacting the facility. No change was made to the final rule as a result of this comment.

Comment: Modelers and the modeling techniques (computer codes) should be validated for both aircraft structures and impacted facilities which are identical, or similar to, those being evaluated. (Weidlinger-16-3)

NRC Response: The NRC agrees that the codes used to perform the assessments should be validated against available impact test data to ensure that the material properties and models used in the analysis are realistic for the impact being assessed. The NEI guidance, currently being reviewed by the NRC staff for potential endorsement, provides a basis for validating the computer codes against available impact test data. No change was made to the final rule as a result of this comment.

Comment: The Commission should support use of consistent methodologies. The public will benefit if the aircraft impact assessments for different technologies utilize a consistent methodology. To this end, the NRC should review and approve the technical guidance developed by NEI to conduct the aircraft impact assessment. A consistent methodology will also increase the effectiveness of peer reviews. (NEI-23-7.a; AREVA NP-15-4)

NRC Response: The NRC agrees that the aircraft impact assessments for different technologies should utilize a consistent methodology. Utilizing an approach that the NRC has endorsed would lead to a more efficient and timely review. To that end, the NRC is considering endorsing NEI guidance for aircraft impact assessment methodology. No change was made to the final rule as a result of this comment.

Comment: The rule should make clear that the detailed assessment for shock be based upon practical and realistic criteria and methodologies. The standard methodology being developed by the industry breaks equipment down into four fragility classes with a damage envelope based on distance from the point of impact for each class. This provides a consistent approach for all designers to use and is based on information the NRC provided to the industry when the current plants were being evaluated. (NEI-23-7.b)

NRC Response: The NRC agrees that the methods and acceptance criteria used for the

assessments, including shock, should be based on practical and realistic assumptions. The NRC is considering endorsement of guidance developed by NEI to provide a consistent approach to the assessment. Details of methodology and approach for assessments are not necessary in the rule, but rather are more appropriate in guidance documents. No change was made to the final rule as a result of this comment.

Comment: Realistic assumptions should be used in performing the assessment of the plant response to the impact. While the Commission affirms its support for the use of realistic assumptions, the rule itself is silent regarding this aspect of the assessment. The rule should be explicit in this regard. The commenters provided specific suggestions as to how the proposed rule language may be modified to reflect their' recommendation. (NEI-23-8; AREVA NP-15-5)

Comment: The proposed rule should be revised to clarify that the impact assessment may use realistic assumptions regarding the performance of the plant. Consistent with the nature of the rule and evaluation of beyond-design-basis accidents in general, the rule should explicitly state that the evaluation may be performed using realistic assumptions regarding the performance of plant design features, functional capabilities, and strategies, rather than conservative assumptions that are typically used in evaluations of design basis accidents. The statement of considerations allows for the use of realistic assumptions. See id. at 56,292. However, the rule language itself does not reflect this concept. Given the importance of this issue, the commenter recommends that proposed 10 CFR § 52.500(b) be revised to incorporate this concept, and provided suggested changes to the proposed rule's language to reflect the commenter's recommendation. (Morgan Lewis-10-6)

NRC Response: The NRC disagrees that the rule language should be revised to clarify that the impact assessment may use realistic assumptions. As some commenters pointed out, the statement of considerations in the proposed rule stated that the methods and acceptance criteria used in the aircraft impact assessment should be based on realistic assumptions. This statement remains in the final rule. The NRC does not agree that this level of detail is appropriate for inclusion in the rule language itself. More details regarding the assumptions

made in performing the assessment can be found in NRC guidance documents. No change was made to the final rule as a result of these comments.

VII. Evaluation of Design Features, Functional Capabilities, and Strategies

Comment: The proposed rule should be revised to clarify that an applicant need only provide protection for containment integrity or for core cooling; both functions need not be simultaneously protected. If core cooling is maintained, there will be no significant releases to the public, even if containment integrity is breached. As long as the core is adequately cooled, the source term will be low and will not present a threat to the public health and safety. Similarly, if containment integrity is maintained, there will be no significant releases to the public, even if core cooling is lost. As provided in the footnotes to 10 CFR § 52.47(a)(2)(iv) and § 52.79(a)(1)(vi), the containment must be able to perform its function assuming a major accident, such as a core melt. Such an accident, by its nature, assumes loss of core cooling. Therefore, if containment integrity is maintained following an aircraft impact, sufficient protection is provided to the public during such a beyond-design-basis accident. This recommendation

appears to be consistent with the intent of the proposed rule. For example, in Chairman Klein's comments on SECY-06-0204, which are incorporated into the Commission's Staff Requirements Memorandum dated April 24, 2007, the Chairman stated that "new reactor designs [should] incorporate design features to prevent a simultaneous loss of containment integrity and core cooling as a result of an aircraft impact." (emphasis added). Similarly, the statement of considerations for the proposed rule, 72 Fed. Reg. at 56,293, indicates that plant structures (including, presumably, the containment) may be breached by aircraft parts and jet fuel, provided that key safety functions can still be accomplished. Similarly, it is unnecessary for an applicant to demonstrate that both spent fuel pool integrity and spent fuel cooling are maintained following the beyond-design-basis aircraft impact. If spent fuel cooling is maintained, even though spent fuel pool integrity is not, the spent fuel will be protected, and the effects of the aircraft impact will be minimized. The commenters provided specific suggestions as to how the proposed rule language may be modified to reflect the commenters' recommendation. (Morgan Lewis-10-1; NEI-23-10)

NRC Response: The NRC agrees, in part, with the commenters, but the NRC did not adopt the change to the proposed rule language suggested by the commenters. The final rule requires that applicants identify and incorporate into their design those design features and functional capabilities that avoid or mitigate the effects of the aircraft impact on core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity. However, this requirement is explained further in the statement of considerations for the final rule, where the NRC states that the designer must ensure that the survivability of each of these key safety functions is *considered* in the initial assessment. Thus, the designer's focus should be on core cooling capability, containment integrity, spent fuel cooling, and spent fuel pool integrity following the aircraft impact. The statement of considerations explains further that, in performing the practicality evaluation, the NRC expects applicants to first consider the effects of the aircraft impact on core cooling capability and spent fuel cooling capability. If core cooling capability can be maintained with the applicant's identified design features and functional capabilities, then no further consideration of practical design features and functional capabilities to maintain containment integrity is necessary. Likewise, if spent fuel cooling capability can be maintained with the applicant's identified design features and functional capabilities, then no further consideration of practical design features and functional capabilities to maintain spent fuel pool integrity is necessary. However, if there are no practical means to maintain core cooling capability, then the applicant must also consider practical design features and functional capabilities to maintain containment integrity. Likewise, if there are no practical means to maintain spent fuel cooling capability, then the applicant must also consider practical design features and functional capabilities to maintain spent fuel pool integrity.

Comment: The final rulemaking should clarify the meaning of the term "avoid." The proposed rule states that "the application must 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." The Commission should explain that the term "avoid" is not intended to mean preventing an aircraft impact but instead means preventing damage to specific functions. (AREVA NP-15-6; Morgan Lewis-10-4)

NRC Response: The NRC agrees, in part, with the commenters. The NRC has added additional explanation of the term "avoid" in the statement of considerations for the final rule. The NRC notes that the rule requires the designer to assess the effects the impact of a large,

commercial aircraft on the facility. However, as noted in the next comment response, a reactor designer could voluntarily choose to utilize design approaches which preclude a direct impact of a large, commercial aircraft on the facility. Adoption of such an approach, however, would not preclude the need to perform an impact assessment and evaluation of that design approach. For example, an aircraft impact assessment would still have to be performed to determine if fuel and debris from the aircraft hitting a suspended wire mesh would adversely impact the plant, and an evaluation performed of design alternatives to evaluate if there were design features and functional capabilities to avoid or mitigate the consequences of such secondary effects. The NRC has added additional discussion to clarify the meaning of "avoid" in the final rule statement of considerations.

Comment: The proposed rule should require the assessment of features that would prevent an aircraft impact from occurring. Examples of such systems include camouflage, smoke screen systems, or the use of design features which could breakup an incoming aircraft before making contact with the reactor system, structures and components (such as the that conceptualized by Committee to Bridge the Gap's "Beamhenge" steel I-beam and steel cable structure). (NYS AG-17-3, Beyond Nuclear-3-2.d, Beyond Nuclear-3-4.i, Beyond Nuclear-3-4.k, Pilgrim Watch-4-3, Pilgrim Watch-4-15)

NRC Response: The NRC disagrees with the commenters. The NRC does not intend the rule to include as an objective the avoidance of aircraft impacts on a nuclear power plant. Rather, it requires the reactor designer to assume that an aircraft impact occurs, for the purpose of performing the assessment and evaluation as directed by the rule, unless the designer can demonstrate that an impact will not occur. Thus, avoidance is a voluntary approach that could be selected by the designer, but is *not* required to be considered by the rule. The commenter did not provide any reasons why the proposed rule's objective should be modified and expanded to include the consideration of possible means of avoiding aircraft impacts. While a reactor designer may choose to incorporate such features into a reactor design voluntarily, the NRC does not believe that consideration of such features should be required by this rulemaking. This determination is based, in part, upon the fact that such impacts are beyond-design-basis events, the low likelihood of such events, the unproven capabilities of such design features, and the NRC's qualitative assessment that the benefits of such design features are unlikely to outweigh the cost of including such design features. No change was made to the final rule as a result of this comment.

Comment: *New designs should incorporate aircraft deflection shields such as those proposed by Dan Hirsch (Committee to Bridge the Gap) or Ted Potol (MIT professor), . (TMI Alert-12-15)*

NRC Response: The NRC disagrees with the commenter. As discussed above in the NRC's response to Beyond Nuclear's comment 4.k, the NRC does not intend the rule to include as an objective the avoidance of aircraft impacts on a nuclear power plant. In addition, the NRC is not pursing a prescriptive regulatory approach for this rulemaking and therefore would not dictate a specific technology as being necessary for compliance. No change was made to the final rule as a result of this comment.

Comment: The proposed rule should be clarified to indicate that if the existing features are determined to be sufficient, the evaluation need not discuss any new design features. The Supplemental Information suggests that applicants perform an evaluation of the alternatives

(72 Fed. Reg. 56,293). However, if the assessment concludes that the existing design and functional capabilities are sufficient to maintain containment integrity or core cooling and maintain spent fuel pool integrity or spent fuel cooling, then no further assessment is required. The proposed language should be revised to clarify that an applicant need not evaluate or adopt practicable design alternatives for preventing or mitigating aircraft impact, if the impact assessment performed in accordance with proposed 10 CFR § 52.500(b) demonstrates that the plant's design capabilities provide protection against aircraft impacts. For example, if the assessment in proposed Section 52.500(b) determines that the reactor containment remains intact or that the core remains cooled, and also determines that spent fuel cooling is maintained following an aircraft impact, then the applicant would not have to perform the alternative evaluations suggested by Section 52.500(c) but would only need to describe the existing design features, functional capabilities and strategies to avoid or mitigate the effects of the aircraft impact. If, however, the proposed Section 52.500(b) assessment does not conclude that the design will provide sufficient protection against an aircraft impact, then the applicant would modify the design and/or strategies to meet the new plant acceptance criteria for protection against an aircraft impact, within the confines of the "practicability" standard. Consistent with the above comments, in the November 15, 2007 NRC public meeting, the NRC staff commented that an evaluation of a range of alternative design features need not be performed if the plant design has sufficient features, capabilities or strategies to avoid or fully mitigate aircraft impacts. (NEI-23-11; Morgan Lewis-10-2)

NRC Response: The commenters' remarks appear to be aimed at current or near-term applicants with designs that are complete or nearly complete. In such cases, the NRC generally agrees with the commenter that an applicant need not evaluate or adopt new practical design alternatives for preventing or mitigating the effects of an aircraft impact if the impact assessment performed in accordance with the final rule demonstrates that the plant's existing design capabilities avoid or mitigate the effects of an aircraft impact. The NRC has addressed this issue in the section-by-section analysis for 10 CFR 50.150(b), which states that the NRC recognizes that the designers' approaches for implementing the rule may differ, depending upon the stage of completion of the facility design when the final rule is adopted. For example, if a facility design is largely or entirely completed when the 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 an capabilities, and then identify any additional features and capabilities. The final rule, 10 CFR 50.150(b) requires that the applicant identify and incorporate into the design those design features and functional capabilities that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact on core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity. If such design features and functional capabilities have already been incorporated into the design, then the intent of the rule has been met. However, the applicant will still be required to describe how these "pre-existing" design features and functional capabilities avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact. The NRC has included additional discussion on this issue in the statement of considerations for the final rule.

Comment: The NRC should affirm that a design strategy that protects containment, spent fuel pool, and adequate core cooling capability from aircraft damage meets the regulatory objective of the rule and does not need to evaluate or adopt additional design alternatives for preventing

or mitigating aircraft impact. Such a design strategy is the most optimal method of plant protection. If the rule could be interpreted to require a mitigation strategy regardless of the level of protection, it would dilute the value of a "shield" type design strategy. Vendors should be able to fully realize the technical merits of their design choices. (AREVA NP-15-7)

NRC Response: The NRC agrees, as a general matter, that a "shield-type" design strategy which "protects" containment, spent fuel pool and adequate core cooling capability from sustaining any damage due to an aircraft impact is the most optimal method of plant protection. Assuming that such a design strategy can be shown to be effective, the NRC also agrees that no further evaluation of alternatives to prevent or mitigate aircraft impact damage would likely be necessary. This is consistent with the NRC staff's response to questions on this matter at a November 15, 2007 public meeting on the proposed rule. *See* Tr. 40-41. No change was made to the final rule as a result of this comment.

Comment: The proposed rule requires applicants to perform an assessment of the effects of aircraft impact, but does not require that the assessment be submitted to the NRC. The only requirement is a description of the design features, functional capabilities, and strategies to avoid or mitigate. This language imposes no substantive requirement. An applicant may identify the features of the design as it existed without benefit of this rule, represent that these features mitigate the effects of the impact, and thereby satisfy the rule's requirements. The rule is thus too vague. (Coldren-8-1)

NRC Response: The NRC does not agree that that the rule imposes no substantive requirement or is too vague. Nevertheless, the NRC has revised the rule language for clarity in the final rule and has added additional explanation of the aircraft impact assessment requirements in the section-by-section analysis for the final rule. The final rule requires that applicants perform a design-specific assessment of the effects on the facility of the impact of a large, commercial aircraft and identify and incorporate into the design those design features and functional capabilities that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact on core cooling capability, containment integrity, spent fuel cooling capability, and spent fuel pool integrity. Applicants are then required to submit a description of the design features and functional capabilities identified and a description of how they avoid or mitigate the effects of the aircraft impact. The NRC does agree that it is possible for an applicant that already has an essentially complete design to meet the requirements of the rule with design features and functional capabilities that already exist in the design. This would indicate that the designer was forward-thinking in its original design when it included features that provide additional inherent protection against aircraft impacts. The final rule language reflects changes intended to clarify the nature of the aircraft impact assessment and provides additional discussion of the assessment requirements in the statement of considerations.

Comment: The rule should contain specific thresholds for the adoption of design features, in order to prevent the designer, when considering the tradeoffs encountered, from defaulting to the "no change required" outcome. Design features involve tradeoffs, and increases in protection to aircraft impacts may result in decreases in safety with respect to other matters, as set forth in a hypothetical situation described by the commenter. The proposed rule's language may be read to allow the designer to forgo a large security upgrade on the basis of a miniscule adverse safety consequence. (UCS-29-4.a, Coldren-8-6)

NRC Response: The NRC does not agree that the rule should contain specific thresholds for the adoption of design features. Because an aircraft impact is a beyond-design-basis event, the rule requires applicants to adopt design features and functional capabilities that avoid or mitigate the effects of the aircraft impact *to the extent practical*. The final rule's statement of considerations explains that *to the extent practical* means that the NRC intends that designers include in their designs those design features and functional capabilities that are reasonable, efficient, and workable. Thus, the final rule does not require a designer to use a design feature or functional capability which is, strictly speaking, technically capable of mitigating the effect of the aircraft impact, but which is not cost-effective or introduces inordinate complexities in integration into the plant design or operational procedures. Despite the commenter's objections, the NRC believes that it would not be practical to introduce a design feature or functional capability that could have adverse safety or security consequences under a different operational or accident scenario. Because the aircraft impact is a beyond-design basis event, the objective of the 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 avoid or mitigate the effects of an aircraft impact. However, this additional protection should not come at the cost of reducing protection under a different scenario. This rule is intended to result in new nuclear power reactor facilities being more inherently robust regarding an aircraft impact than if they were designed in the absence of this final rule. No change was made to the final rule as a result of this comment.

Comment: The commenter concurs with the use of the "to the extent practicable" criteria for the evaluation of the design features, functional capabilities and strategies to avoid or mitigate the effects of the applicable aircraft impact (72 Fed. Reg. 56,293). This standard will allow each designer to evaluate each feature or function within their own design and give consideration to all the competing aspects involved. (NEI-23-9)

NRC Response: The NRC agrees that the rule provides the designer the flexibility to evaluate its design and, by consideration of the "practicality" of candidate design features and functional capabilities, give consideration to competing values and relevant aspects. No change was made to the final rule language as a result of this comment. However, the NRC notes that the final rule substitutes the term "practical" for "practicable."

Comment: The NRC should provide more specific information regarding the proposed rule's requirement that design features be included "to the extent practicable," with respect to the mitigation of consequences, including acceptable risks or consequences. (Weidlinger-16-4)

NRC Response: The NRC does not agree that the final rule should provide more specific information regarding the requirement that design features be included "to the extent practicable," with respect to the mitigation of consequences, including acceptable risks or consequences. Because an aircraft impact is a beyond-design-basis event, the final rule requires applicants to adopt design features and functional capabilities that avoid or mitigate the effects of the aircraft impact *to the extent practical*. The final rule's statement of considerations explains that *to the extent practical* means that applicants are expected to include those design features and functional capabilities which are realistically and reasonably feasible from a technical engineering perspective. For example, the NRC believes that it may be practical to employ existing technologies currently in use in the commercial nuclear power

industry or in another industry. However, it would not be practical to introduce a design feature or functional capability that could have adverse safety or security consequences under a different operational or accident scenario. Moreover, the NRC intends that designers include in their designs those design features and functional capabilities that are reasonable, efficient, and workable. Thus, the final rule does not require a designer to use a design feature or functional capability which is, strictly speaking, technically capable of mitigating the effect of the aircraft impact, but which is not cost-effective or introduces inordinate complexities in integration into the plant design or operational procedures. Any further details about how to determine which design features and functional capabilities should be considered *practical* are more appropriate for inclusion in guidance documents. No change was made to the final rule as a result of this comment.

Comment: The final rule should clarify that costs may be considered in determining what is "practicable." This is appropriate for a beyond-design-basis event such as an aircraft impact, and is consistent with the remarks made by the NRC staff in a public meeting on the Proposed Rule on November 15, 2007. See Slide 24 of the NRC's presentation. This position is also consistent with Commissioner Merrifield's following comments: "I suggest that, for our purposes, the definition of practicable should include those design features that are realistically and reasonably feasible from a technical engineering perspective but they <u>should also be reasonable from a cost effectiveness standpoint</u>." Commission Voting Record for SECY-06-0204, Commissioner Merrifield Comments, at 1 (Apr. 24, 2007) (emphasis added). Such a change in the Proposed Rule allowing consideration of costs would be appropriate because a change that is technically "realistically and reasonably feasible" could be entirely cost prohibitive. It would be inappropriate to require changes that are not "reasonable from a cost effectiveness standpoint" to address a beyond-design-basis event. This is also consistent with the Commission's Policy Statement on severe accidents, which states that "[t]he inherent flexibility of this Policy Statement . . . encourages thereby innovative ways of achieving an improved overall systems reliability at a <u>reasonable cost</u>." Policy Statement on Severe Reactor Accidents Regarding Future Designs and Existing Plants, 50 Fed. Reg. 32,138, 32,141 (Aug. 8, 1985) (emphasis added). The statement of considerations or guidance should provide a definition of what is a "reasonable cost;" e.g., the improvement in safety exceeds the cost of the design change. (NEI-23-12.a; Morgan Lewis-10-3; Coldren-8-8)

NRC Response: The NRC agrees that, under the aircraft impact rule, "practicability" (changed to "practicality" in the final rule) can be determined in part by cost, as well as technical feasibility and effectiveness. However, the NRC does not believe that the aircraft impact rule language must specify the elements of the practicality evaluation. Instead, the NRC will include explanatory discussion on the practicality evaluation in the section-by-section analysis for the final rule. Any further details about how to determine which design features and functional capabilities should be considered *practical* are more appropriate for inclusion in guidance documents.

Comment: Cost screening should only be applied on an individual design feature basis and not the complete scope of features considered. (NEI-23-12.b)

NRC Response: The NRC interprets this comment as suggesting that the practicality determination, including consideration of cost, must be done individually for each potential design alternative, rather than "aggregating" all features together and considering the

aggregated cost. The NRC agrees in part. The practicality for each potential design feature and functional capability may be individually evaluated. However, if a designer chooses to aggregate functionally-related features and capabilities in order to simplify the consideration of practicality, it may do so. Such issues are more appropriately addressed in regulatory guidance. No change was made to the final rule as a result of this comment.

Comment: The NRC should, in establishing appropriate criteria for assessing potential design features, follow the model employed by the NRC when it adopted fire protection regulations. The fire protection model could be applied to new reactor designs b requiring reactor designers to: (1) establish discrete aircraft impact zones for the plant; (2) assume the equipment, cabling and components in each impact zone – individually – was disabled by impact and direct consequence (e.g., fire), and (3) determine whether sufficient equipment outside of each affected impact zone survived to allow the reactor to attain and maintain a safe shutdown condition. (UCS-29-4b)

NRC Response: The NRC agrees that the aircraft impact assessment should employ a methodology similar to the one described in this comment. An acceptable approach to analyzing the effects of the impact of a large, commercial aircraft on a nuclear power plant is to take into account the combined damage footprint resulting from the structural, shock, and fire effects. (The damage footprint associated with a particular damage mechanism is the area of the plant where important equipment have lost functionality because of that mechanism.) Equipment and cables within the damage footprint should be assessed to determine the potential and timing of failure resulting from the thermal effects of the fire.

The analysis of safety functions should take into account the damage footprints for the different damage mechanisms in combination with the location of plant equipment to determine which safety systems have been compromised. Systems analysis for aircraft assessment can be seen as a unique type of external event analysis and thus may use insights and information from the external event risk study and fire protection program, including equipment locations and functional dependencies. The NRC believes the discussion in the proposed rule supported the use of such an approach. Therefore, no change was made to the final rule as a result of this comment.

Comment: The commenter questions the proposed rule's lack of acceptance criteria. The commenter adds that it will be impossible to design for very small radiological releases and could not be independently verified. There is no way to test an undefined and asymmetrical threat. (Halac-1-6)

NRC Response: The NRC disagrees with the commenter's implication that there is no way to provide design enhancements for an aircraft impact, which the commenter refers to as "an undefined and asymmetrical threat." The NRC has, in fact, defined the threat that is to be taken into account in performing the aircraft impact assessment by providing the aircraft impact characteristics in the rule. Because an aircraft impact is a beyond-design basis event, the NRC has declined to adopt specific radiological release criteria for meeting the rule. Instead, 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 avoid or mitigate the effects of an aircraft impact. This rule should result in new nuclear power reactor facilities being more inherently robust regarding

an aircraft impact than if they were designed in the absence of this final rule. No change was made to the final rule as a result of this comment.

Comment: The rule should require the adoption of design features that would enable the applicant to ensure no release in excess of 10 CFR Part 100 limits. The applicant should only be allowed to assume outside assistance after a period of 72 hours. (Coldren-8-7)

NRC Response: The NRC disagrees with the commenter. The NRC decided not to adopt an additional acceptance criterion based on 10 CFR Part 100 dose limits in the final rule because the 10 CFR Part 100 limits are limits that the NRC uses, as a matter of historical practice, to judge compliance with design basis requirements. 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 the aircraft impact rule. The NRC's approach to aircraft impacts is consistent with its previous approach to beyond-design-basis events. Therefore, the acceptance criterion contained in the final rule by which the NRC may judge the required assessment continues to be the practicality criterion addressed in 10 CFR 50.150(b), that is, that the applicant must describe how the design features and functional capabilities avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact. In addition, the NRC is making it clearer in the final rule that the assessment must address the effects of the aircraft impact on the key safety functions of core cooling, containment integrity, spent fuel cooling, and spent fuel pool integrity. Additional guidance regarding the parameters of the aircraft impact assessment will be provided in regulatory guidance. No change was made to the final rule as a result of this comment.

Comment: The rule should define "reduced reliance on operator actions." The rule should state the baseline for the measure of the reduction and details of the methodology should be provided in publicly available guidance documents. The rule should describe why operator actions are not desirable. (Coldren-8-9, Halac-1-11)

NRC Response: The NRC agrees in part with the commenter that the final rule should provide more information on what is meant by "reduced reliance on operator actions." In the statement of considerations for the final rule, the NRC has provided additional details on what is meant by the requirement to identify design features and functional capabilities that avoid or mitigate the aircraft impact with "reduced reliance on operator action." This means that active operator intervention and initiation of responsive action to maintain core cooling, containment integrity, spent fuel cooling, and spent fuel pool integrity should be reduced to the extent practical. 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 reliance on operator action to avoid or mitigate the effects of the aircraft impact. The NRC expects the designer to identify and consider in a reasonable process the goal of reducing operator action in avoiding or mitigating the effects of an aircraft impact. "Operator action" includes actions of operators in the control room or at alternative control panels or control areas in controlling the reactor and the nuclear facility. Any design enhancement that can reduce the need for operator action is viewed as desirable because it reduces the potential for human error during the response to an event.

Comment: The NRC should require new reactors to be designed to successfully withstand a

deliberate aircraft impact into sensitive reactor structures, rather than merely asking the reactor designers to consider what design features they might be willing to include in the design to reduce aircraft impact risks. (CBG-22-2)

NRC Response: The NRC disagrees that it should require new reactors to be designed to successfully withstand a deliberate aircraft impact into sensitive reactor structures. As discussed in the statement of considerations for this final rule and in responses to comments above, the NRC determined that the impact of a large, commercial aircraft is a beyond-design-basis event and therefore are not considered necessary for reasonable assurance of adequate protection to public health and safety. Thus, it is not necessary to require new reactors to withstand the impact of a large commercial aircraft, for purposes of providing reasonable assurance of adequate protection. Rather, this rule's goal is to enhance the facility's inherent robustness at the design stage. No change was made to the final rule as a result of this comment.

Comment: Piping which is routed between two buildings, e.g. the reactor and auxiliary buildings, (especially reactor coolant pipes) must be designed with shock absorbing anchor points set sufficiently apart to allow for a rapid movement of the pipes caused by explosions or aircraft impact. This design consideration would not be limited to aircraft fuel explosions but also account for surface bombs and explosive laden aircraft. The key consideration is that the lateral acceleration caused by an aircraft impact or by explosives can far exceed the earthquake-proofing measures currently employed at nuclear plants. (TMI Alert-12-1)

Additional electrical supplies to maintain or regain control of the reactor must be constructed. These would include underground power lines and a secondary set of Emergency Diesel Generators located far from the other set. (TMI Alert-12-2)

Additional electrical busses should be built into various buildings so that a mobile diesel generator can drive to the area that is experiencing a station blackout, plug into the busses and

restore power. These mobile generators would be parked far enough away from the reactor to remain undamaged during an aircraft impact and fire. (TMI Alert-12-3)

All safety related storage tanks, and especially the diesel fuel tanks, must be protected from flying missile debris. These tanks must be located far enough from other buildings to prevent additional fires or the release of hazardous gases, liquids or materials which would impede the responders' ability to provide mitigating action. (TMI Alert-12-4)

The nuclear fuel systems should be redesigned so that new and spent fuel is stored below ground level. Fuel canals and crane systems can be redesigned to transport fuel assemblies between the increased difference of the reactor's elevation to the fuel storage and spent fuel storage elevations. The fuel buildings must be strengthened. (TMI Alert-12-5)

We remind the Commission that electrical wiring has never been tested under "accident conditions" whereby temperatures may exceed the limits of the electrical cables causing catastrophic failure. Therefore, with regard to this rule, all new designs should only incorporate electrical cables which have been tested to meet accident condition stresses which can account for the temperatures of nearby aircraft fires and the thermal effects within a building

experiencing a fire. (TMI Alert-12-6)

Plant designers should create multiple entrance points to a reactor site for emergency responders. These entrance points must be protected and guarded to prevent their destruction. Otherwise the offsite responder plan is ineffective. (TMI Alert-12-9)

Containment building must be strengthened, particularly the containment domes. (TI Alert 11)

Nuclear plants should be built underground, consistent with the views of Dr. Edward Teller. (TMI Alert-12-16)

Control room operation of safe shutdown systems should be protected from the effects of aircraft impact and blast by bunkering the redundant train of electrical circuits and equipment. Such protection should be mandated through prescriptive requirements for passive qualified design features which require electrical circuit integrity of such structures, systems and components in accordance with 10 CFR Part 50, Appendix R, III.G1 and III.G.2. (Beyond Nuclear-3-4.d, Beyond Nuclear-3-4.g, Pilgrim Watch-4-10, Pilgrim Watch-4-13)

Wire mesh covers, spanned over a building to be protected, are practical and economical. (Schmidt-6-3)

NRC Response: The NRC disagrees with these commenters' proposals that the aircraft impact rule must mandate the utilization of the above-listed design approaches. While each of these design features may be effective[1] in addressing the requirements of the rule and, therefore, may be selected by a nuclear power plant designer for inclusion in its design, the proposed rule does not require, in a prescriptive manner, the consideration of specific design features and functional capabilities. The NRC believes that a more performance-based rule, if implemented correctly, will achieve the NRC's objective in affording an enhanced level of safety against aircraft impacts, but in a manner which is less onerous on the nuclear power plant designer as compared with a more prescriptive regulatory approach.

Some of the commenters suggested design alternatives which would prevent a direct impact of a large, commercial impact on the physical structures of current nuclear power plants, *e.g*. the use of a "Beamhenge" structure or suspended wire mesh. While a nuclear reactor or power plant designer may voluntarily choose to adopt such an approach, the final aircraft impact rule does not require consideration of such specific alternatives, as discussed previously.[2]

---

[1] The NRC takes no position in this rulemaking as to the effectiveness, practicality, or cost of the design features identified and/or described by the commenters.

[2] As discussed previously, the use of a design approach which prevents *direct* aircraft impact would not preclude the need to perform an impact assessment and evaluation of that design approach.

The NRC also notes that members of the general public would have an opportunity to present their views on asserted non-compliance with the aircraft impact rule as evidenced by the lack of inclusion of any of these possible design approaches in future design certification rulemakings, as part of the notice and comment process. Interested members of the public may also seek to raise such asserted non-compliance by an applicant for a combined license subject to the aircraft impact rule, by seeking to intervene in a hearing on the combined license application and submitting a contention in accordance with the NRC's requirements (including 10 CFR 2.309).

No change was made to the final rule as a result of these comments.

Comment: The NRC should never allow a reactor design where containment integrity is weakened as a trade-off for modular construction. The so-called "Pebble Bed" reactor is an example of this design where a "citadel" is employed. (TMI Alert-12-12)

NRC Response: This comment addresses safety criteria related to containment design governing the NRC certification and licensing of designs for nuclear power plants. This topic is outside the scope of this proposed rulemaking. No change was made to the final rule as a result of this comment.

Comment: The NRC should not give credit to any reactor for new safety or security assessments associated with this rule unless the measures are tested (as is practical) and actually constructed or enacted. (TMI Alert-12-10)

NRC Response: The NRC interprets the comment to mean that it should not allow applicants to take credit for design features and functional capabilities adopted to comply with the aircraft impact rule unless such design features and functional capabilities are tested and actually constructed or implemented. The NRC does not agree with the commenter's suggestion that features and capabilities must be tested and constructed or implemented before they can be credited as meeting the rule. As the NRC discusses in the statement of considerations for the final rule, 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. The objective of the rule is to provide additional inherent protection to avoid or mitigate the effects of an aircraft impact. The rule should result in new nuclear power reactor facilities being more inherently robust regarding an aircraft impact than if they were designed in the absence of this final rule. The commenter's suggestion is also not practical since the NRC expects that the majority of applicants addressing the requirements of this rule will be design certification applicants. It would be impractical to require the designers (rather than the constructors) of a nuclear power plant to procure, construct, and test design features proposed by the applicant to meet the requirements of the rule. No change was made to the final rule as a result of this comment.

Comment: The final rule should apply the knowledge of previous technical design study groups such as that gained and published in NUREG/CR-1345. The NRC is already aware of design

enhancements such as physically separating the emergency diesel generator room and locating them on different sides of the reactor site. (Beyond Nuclear-3-4a, Pilgrim Watch-4-7)

NRC Response: To the extent that the commenter believes that future reactor designers should be aware of and utilize NUREG/CR-1345 to inform the assessment required under Section 50.150(b), the NRC agrees with this comment. Moreover, to the extent that the commenter believes that the NRC staff should be aware of this information when conducting its implementation oversight of the rule, the NRC also agrees with this comment. However, if the commenter believes that the aircraft impact rule should prescriptively require the applicant to utilize NUREG/CR-1345 and similar studies, then the NRC disagrees with the comment. As discussed previously, the NRC has decided that a more performance-based rule is desirable in this regulatory situation. No change was made to the final rule as a result of this comment.

Comment: The proposed rule must address previous criticisms of typical aircraft hazards analysis where reasonable assurance is undermined by the lack of clear and supported statements on key underlying assumptions. (Beyond Nuclear-3-4.b, Pilgrim Watch-4-8)

NRC Response: The NRC does not agree that the rule must address key underlying assumptions for the aircraft impact assessment required by the rule. That level of detail is more appropriate for guidance documents. Without specific details about which previous criticisms the commenter believes should be addressed by the rule, the NRC is unable to respond further. No change was made to the final rule as a result of these comments.

Comment: The final rule must require that licensees install the security improvements identified as a result of the required assessment and evaluation. Assessments, by themselves will not improve security if improvements are totally discretionary and the plant owners choose not to install the designated improvements. (Northern Lights-18-8)

NRC Response: The NRC agrees with the commenter. The final rule requires applicants to perform a design-specific assessment of the effects on the facility of the impact of a large, commercial aircraft. The final rule then requires applicants to identify *and incorporate into the design* those design features and functional capabilities that avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact [emphasis added].

Comment: Public acceptance of new nuclear requires a clearly-articulated standard for evaluating designs to ensure not only a consistent level of safety, but also a consistent method for evaluating their safety. UNE therefore urges the NRC to adopt a clearly-articulated standard that is transparent and scrutable to members of the public. Under the proposed rule, an applicant must describe "design features, functional capabilities, and strategies that avoid or mitigate, to the extent practicable, the effects of the applicable aircraft impact with reduced reliance on operator actions." The primary shortcomings of relying solely on the practicability standard are its ambiguity and subjectivity. An ambiguous standard that fails to convey the extent to which a design addresses aircraft impacts may not engender public confidence in the safety of new reactor designs. Similarly, an overly-subjective standard may prove difficult to apply consistently given differing designs with various approaches to evaluating aircraft impacts. Accordingly, UNE recommends that the NRC adopt the following functional acceptance criteria: (1) Demonstrate that the reactor core remains cooled or the containment remains intact, and (2) Spent fuel cooling or spent fuel pool integrity is maintained. For designs

that meet this standard, there would be no need to perform the evaluation currently required by proposed section 52.500(c). Instead, the application should simply describe how design features, functional capabilities, and strategies avoid or mitigate the effects of the applicable aircraft impact with reduced reliance on operator actions. (UniStar-26-3)

NRC Response: The NRC response to this comment is set forth as part of the NRC's overall response to Question 2 of the proposed rule.

VIII. Issue Resolution, and Regulatory Implementation Issues

Comment: The NRC should clarify that its review of the assessment[3] and evaluation, including the insights drawn by the applicant from the assessment in preparing the evaluation, is part of the design certification rulemaking. The NRC should also clarify that the acceptability of the assessment and evaluation and the effectiveness and practicability of the design and other features adopted to avoid or mitigate, to the extent practicable, the potential effects of the applicable, beyond-design-basis aircraft impact are considered resolved for subsequent COL applications referencing the certified design. (Winston&Strawn-14-1)

NRC Response: The NRC agrees with the commenter that the assessment and what the proposed rule separately referred to as the "evaluation" (but which the final rule subsumes into the assessment) is part of the design certification rulemaking, and therefore constitutes a matter which is accorded issue resolution under the finality provisions (to be included in future design certification rules) comparable to Section IV.B.1. of the four current design certifications.

The NRC has evaluated whether: (i) the draft rule language should be revised to explicitly acknowledge that the assessment and evaluation are both accorded issue resolution; (ii) the statement of considerations for the final rule should specifically state that the NRC intends to include such language in Section IV.B.1. of future design certification rules; or (iii) whether it is sufficient to include a discussion of this matter in the section-by-section discussion. The NRC concludes that rule language in either the final aircraft impact rule, or in future design certification rules, is unnecessary and may have unintended adverse consequences. The NRC's regulations contain numerous substantive safety requirements, for which issue resolution is accorded consistent with 10 CFR 52.69 and the general principles outlined above,

---

[3]The NRC interprets the commenter's position as extending to both the assessment required by proposed § 52.500(b), as well as the evaluation required by proposed § 52.500(c). This interpretation is based on the NRC's analysis of the comment, which appears to be focused on ensuring that there is issue resolution for all matters within the scope of the proposed rule's requirements. Thus, although the comment explicitly addresses only the issue resolution of the evaluation, the NRC believes that the overall thrust of the comment was directed at both the assessment and the evaluation.

but such issue resolution is not confirmed explicitly (either in Parts 50 or 52, or in the individual design certification rules). To explicitly identify only one technical requirement as being accorded issue resolution calls into question whether other technical requirements are also accorded issue resolution. Thus, the NRC is clarifying this matter in the statement of considerations for the final rule. No change was made to the final rule as a result of this comment.

Comment: The NRC should clarify that contentions on the adequacy of the assessment or the evaluation (including contentions that seek to raise potential design features, functional capabilities, or strategies not selected by individual applicants for inclusion in the certified design) will not be entertained in individual proceedings for COLs that reference a certified design subject to proposed 10 C.F.R. § 52.500. Instead, a person who seeks action with respect to a proposed standard design certification on the basis that the impact assessment or evaluation is inadequate could submit comments in the notice and comment phase of the design certification rulemaking. (Winston&Strawn-14-2)

NRC Response: The NRC agrees with the commenter that contentions on the adequacy of the assessment or evaluation will not be entertained in individual combined license application proceedings which reference a certified design subject to the aircraft impact rule. This was addressed, with respect to the assessment, in the proposed rule's statement of considerations, *see* 72 FR at 56292 (third column). However, this was not addressed with respect to the evaluation in the proposed rule's statement of considerations, *see* 72 FR at 56923-94. The NRC has evaluated whether: (i) the draft rule language should be revised to explicitly reflect the NRC's position on issue resolution in combined license hearings referencing design certifications that comply with the aircraft impact rule; (ii) the statement of considerations for this rulemaking should specifically state that the NRC intends to include such language in Section IV.B.1. of future design certification rules; or (iii) whether it is sufficient to include a discussion of this matter in the final rule's statement of considerations. The NRC concludes that it is sufficient to address this matter in the statement of considerations, but that the final rule's statement of considerations must be expanded to address the treatment of contentions on the evaluation in a combined license proceeding. The final rule's statement of considerations includes this clarifying discussion. No change was made to the final rule as a result of this comment.

Comment: The proposed rule should be revised to clarify that simplified assessment impact techniques may be used by licensees to evaluate design changes. Paragraph (c) of the proposed rule states that, if a licensee changes its design, the licensee must "re-perform that portion of the evaluation" of aircraft impacts addressing the design change. It may not be necessary to re-perform the entire evaluation. Instead, it may be possible to show that the design change is bounded by the original design, or that the change provides an equivalent level of protection as the original design, without re-performing the original evaluation. Additionally, the rule language should account for COL applicants that reference a design certification that is subject to 10 CFR 52.500. The commenter provided suggested changes to the proposed rule's language to reflect the commenter's recommendation. (NEI-23-13; Morgan Lewis-10-5)

NRC Response: The NRC agrees that the rule requirements governing evaluation of design changes should be revised to clarify that simplified assessment impact techniques may be used

by licensees to evaluate design changes. The proposed rule required the licensee to perform "that portion of the evaluation ... addressing the changed feature, capability, or strategy." The NRC has revised this requirement in the final rule, which requires that, if the licensee changes the information required by 10 CFR 52.79(a)(47) to be included in the FSAR, then the licensee must 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 52.79(a)(47) to be included in the final safety analysis report to describe how the modified design features and functional capabilities avoid or mitigate, to the extent practical and with reduced reliance on operator actions, the effects of the aircraft impact. The NRC agrees that it may not be necessary to re-perform the entire assessment and that 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 re-performing the original assessment.

One commenter also stated that the rule language should account for COL applicants that reference a design certification that is subject to 10 CFR 52.500. The proposed rule did account for this class of applicants in proposed 10 CFR 52.502(b) which stated that for combined license applicants or holders which are not subject to 10 CFR 52.500 but reference a standard design certification which is subject to 10 CFR 52.500, proposed departures from the information required by 10 CFR 52.47(a)(28) to be included in the final safety analysis report for the standard design certification are governed by the change control requirements in the applicable design certification rule. However, the NRC has removed this provision in the final rule language because it addresses a class of applicants that are not subject to the main provisions of the aircraft impact rule. In addition, the proposed rule provision merely provided a reference to how design changes would be controlled for these applicants and did not contain any actual requirements. The NRC did, however, retain the discussion about how design changes affecting the aircraft impact assessment would be handled for these applicants in the statement of considerations for the final rule.

Comment: The aircraft impact assessment need not be updated as part of an application for renewal of a design certification, combined license, or manufacturing license. The assessment of large, commercial aircraft impacts is not an aging-related matter, nor is it based on time-limited considerations. Therefore, requiring that the information be updated as part of a renewal application would not produce a better regulatory outcome. (AREVA NP-15-2; NEI-23-5)

NRC Response: The NRC agrees that impacts of large, commercial aircraft is neither an aging-related matter, nor is it based on time-limited considerations. However, by itself, this argument does not constitute a sufficient basis for an overall regulatory decision in this rulemaking as to why the NRC's license renewal review should not include reconsideration of the results of the aircraft impact. The NRC's original and revised license renewal rulemakings, which limited the license renewal review to aging and time-limited considerations, was based upon the NRC's finding that its ongoing regulatory processes provide continuing assurance of adequate protection to public health and safety and common defense and security. The NRC believes that the aircraft impact rulemaking, coupled with the NRC's continuing efforts to evaluate the threat environment, and consult with other cognizant federal agencies, and the NRC's authority to issue appropriate orders or to engage in future rulemaking to modify the aircraft impact rule if appropriate, provide the bases for an NRC determination that that NRC's regulatory process for assessing future airborne threats to nuclear power plants is adequate, such that a special review of the facility during license renewal to address aricraft impacts is not

necessary. Thus, the NRC has not adopted any changes in either the final aircraft impact rule, or in 10 CFR Parts 52 or 54, that would require reconsideration of aircraft impacts at the renewal stage of any license, approval or design certification.

Comment: The final rule should clarify that the design features and related mitigation measures incorporated into the design as the result of the aircraft impact rule are part of the design certification, and are not part of the physical security requirement of the plant. Consequently, these design features and mitigation measures would not be subject to review at the time of the COL. (NEI-23-2)

NRC Response: The NRC agrees with the commenter 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*. The concept of issue resolution and finality would be undercut if the NRC were to permit a re-review at the combined license stage of design features and functional capabilities which were identified under the aircraft impact rule and included in the referenced design certification.

However, the NRC disagrees with the commenter's apparent view that design features and related mitigation measures 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 aircraft impact rule does not require consideration of physical security concerns in identifying design features and functional capabilities. Hence, the NRC's approval of the design can logically extend only to compliance with the aircraft impact rule's requirements, and cannot be a basis for concluding that the overall plant meets the physical security requirements in 10 CFR Part 73. The NRC recognizes that the NRC's review of the plant's physical security at the combined license application stage must take into account the design features and functional capabilities incorporated into the design as a result of the aircraft impact rule, and that no change to those already-approved design features and functional capabilities can be made as a result of the physical security review at the combined license stage. Nonetheless, the NRC does not believe that it is accurate to say that aircraft impact rule design features and functional capabilities are "not subject to review" at the combined license application stage. No change was made to the final rule as a result of this comment.

IX. Protection of Safeguards Information and Other Sensitive Information Associated with the Aircraft Impact Rule

Comment: The proposed rule should not contain the "design basis scenarios" (e.g., the size and speed of the aircraft postulated to impact the facility) describing exactly the parameters to be protected in aircraft impacts, or the details of the design features that may be incorporated

into the design to protect against aircraft impacts. This would provide potential terrorists with important information on planning of possible air attacks on nuclear power reactors. (Sweeney-2-1a)

NRC Response: The NRC agrees with the commenter that the detailed aircraft impact scenarios[4] should not be made public, in part for the reasons generally expressed by the commenter. The proposed rule provided information on the aircraft impact characteristics sufficient to allow members of the public and interested stakeholders to comment on the proposed rule. The final rule, which contains the same level of information as the proposed rule, provides information sufficient for public stakeholders to understand, in general terms, the requirements on aircraft impact that the facility designer must meet. The detailed information, which would be necessary for the nuclear power facility designer, but was not necessary to provide informed comment on the rule itself and is not necessary for public stakeholders to understand the requirements of the final rule, will be treated as Safeguards Information (SGI). Access to SGI on the aircraft characteristics and impact scenarios will be restricted in accordance with the "need to know" principle, and applicable statutory and regulatory requirements. No change to the final rule was made as a result of this comment.

Comment: The detailed analysis of aircraft-on-containment studies, or rules derived therefrom, and the details of installed features actually implemented should not be available except under the strictest secrecy regime involving the fewest people (and should be withheld from NRC personnel), and then only for those few instances when needed to design robust structures. (Sweeney-2-1b)

NRC response: The NRC generally agrees with the commenter's view that detailed analyses of aircraft-on-containment studies and the detailed analyses of installed features should be protected from general public dissemination, and revealed only on a need-to-know basis to persons who have satisfied applicable requirements for access to SGI. As noted above, the NRC has designated the detailed aircraft impact parameters associated with this rule as SGI, and has only made the information available to a limited group of persons who have met the above-mentioned criteria. The protection of SGI is a very serious matter. Pursuant to Section 147 of the Atomic Energy Act of 1954, as amended (AEA), and 10 CFR 73.21, the unauthorized disclosure of SGI is subject to criminal and civil penalties. However, the NRC notes that the description of design features and functional capabilities may be publicly available without disclosing information which has security significance. For example, simply identifying on the public record that a wall provides protection against a fire resulting from an aircraft impact,

---

[4] The NRC notes that the proposed rule would not deem the aircraft impact required to be analyzed to be a "design basis accident." Nonetheless, the design features selected by the designer and supporting information would be part of the "design basis" of the design, inasmuch as these design features were the result of a regulatory requirement and must be described in the FSAR.

without publicly disclosing the underlying technical analyses or evaluation, does not disclose information that would prove useful to a potential adversary seeking to neutralize the wall's functional capability. So long as the underlying analysis or evaluation of the wall remains non-public, the significance of that wall from a security standpoint remains unknown to the public and a potential adversary.

To the extent that the commenter suggests that the detailed aircraft information should be classified as National Security Information and that no access should be provided to NRC personnel responsible for overseeing the applicant's/licensee's activities for complying with the rule, the NRC disagrees with the commenter. The federal government's requirements for the protection of classified National Security Information are governed by Executive Order 13292, which the NRC has implemented through 10 CFR Part 95, "Facility Security Clearance and Safeguarding of National Security Information and Restricted Data," and Management Directive 12.2, "NRC Classified Information Security Program." The Commission has determined that the information required by the aircraft impact rule is not appropriate for designation as classified National Security Information. The NRC believes that designation of the aircraft impact parameters as SGI is sufficient to provide protection of this information from unauthorized disclosure. Furthermore, the NRC points out that information related to the physical protection of nuclear power plants is currently protected as SGI, and that an applicant's/licensee's documents describing its security measures and implementing activities are subject to inspection and audit by NRC personnel. The commenter does not explain why information related to implementation of the aircraft impact rule – an enhanced protection rule - is fundamentally different from information related to licensees' physical security measures, such that NRC access to implementation information deemed to be SGI may be granted for one but not the other. No change was made to the final rule as a result of this comment.

Comment: If the responsibility for protecting nuclear power plants is removed from the Department of Defense and placed within the NRC and/or the Department of Energy (DOE), then increased security protections must supplant the "simplistic domestic openness previously allowed." (Sweeney-2-2)

NRC Response: The NRC does not agree with the commenter's apparent belief that the aircraft impact rule represents the agency's determination that the NRC, rather than the Department of Defense (and the national intelligence agencies), should be responsible for the protection of nuclear power plants against the kind of adversaries for which the Department of Defense and the nation's intelligence agencies are responsible. As noted in the recently issued design basis threat final rule (72 FR 12705; March 19, 2007), the Commission recognizes that the defense of a nuclear power facility against beyond-design basis threats is the responsibility of the federal government, not individual reactor licensees. The aircraft impact rule represents the NRC's determination that substantial additional protection to public health and safety and common defense and security may result if the rule is implemented for future nuclear power reactors. The NRC reiterates that the rule does not contemplate active measures intended to "defend" the plant against an aircraft impact or prevent an aircraft impact from occurring. The rule is directed at requiring a deliberate, organized assessment of the potential effects of an aircraft impact at a nuclear power plant, together with evaluation of possible design alternatives (design features and functional capabilities) intended to minimize or preclude the adverse effects of aircraft impacts mandated by the rule. In essence, the rule is an extension of the NRC's longstanding principle of "defense in depth," and does not, in any way, represent an

NRC determination that its licensees are responsible for matters traditionally accorded to the military and national intelligence agencies. No change was made to the final rule as a result of this comment.

Comment: The proposed rule includes only a general description of the beyond design basis aircraft characteristics. Although the commenter acknowledges the need for NRC use of safeguards or secret information, the current NRC has abused the public trust. Thus it is necessary that the rule contain substantive criteria to ensure that the NRC will not rubberstamp industry submittals. The absence of any substantive criteria make the proposed rule fundamentally flawed. (Greenpeace-19-3)

NRC Response: The NRC agrees with the commenter's observation that the aircraft impact rule contains a general description of the aircraft impact characteristics, and appreciates the commenter's acknowledgement that the NRC must protect safeguards or secret information, and the commenter's implicit recognition that detailed information on aircraft impact characteristics must be withheld from general public access.

The NRC, however, disagrees with the commenter that the NRC has "abused the public trust." It is not possible for the NRC to respond to this claim, inasmuch as specific examples were not provided. The NRC reiterates, however, that it has issued a series of orders to nuclear power plant licensees to implement many security enhancements following the events of September 11, 2001. These specific requirements of those orders have not been made public, to ensure that information would not be available to persons or entities with malevolent intent. The NRC believes that this course of action is consistent with the NRC's statutory mandate to ensure that licensed activities are not inimical to the common defense and security. However, a significant rulemaking -- the Power Reactor Security Rulemaking -- is underway that would, in part, codify security requirements similar to those that had previously been imposed by those orders. The proposed rule for that rulemaking was published for comment on October 26, 2006 (72 FR 62664), with a supplemental proposed rule published on April 10, 2008 (73 FR 19443). In addition, several public meetings were held during 2006 and 2007 and the NRC has received numerous public comments on that rulemaking.

The NRC disagrees with the commenter's suggestion that the proposed rule contains no substantive criteria that the NRC would use in assessing the adequacy of applicant submittals (and implicitly, the detailed information necessary to demonstrate compliance with the aircraft impact rule, which is retained by the applicant but available for NRC inspection and audit). The final rule, which is largely the same as the proposed rule, sets forth the following criteria for identifying design features and functional capabilities: (1) the design features and functional capabilities must be directed at avoiding or mitigating the effects of the aircraft impact on the four plant safety functions listed in the rule; (2) the features and capabilities must accomplish avoidance or mitigation with reduced reliance on operator action; and (3) the features and capabilities must accomplish avoidance or mitigation to the extent practical. The NRC believes that this level of description of acceptance criteria is sufficient to provide regulatory efficiency, predictability and transparency, given the NRC's determination that the applicable aircraft impact is a beyond-design-basis event.

No change was made to the final rule as a result of this comment.

Comment: The values for the aircraft parameters should be publicly available. There is no basis or justification for failing to include the specific values associated with the parameters stated in the proposed rule. The relevant aircraft parameters observed on 9/11 have been previously published in numerous government documents and there are no security restrictions on this information. These parameters include and aircraft type, weight, speed, and fuel load. The specific details of the results of the evaluations may need to be kept secret, but the input parameters should be publicly available. (Coldren-8-2b)

NRC Response: The NRC disagrees with the commenter's proposal that the detailed aircraft impact characteristics ("parameters") should be publicly available, and there is no basis or justification for not including detailed or specific values for the parameters in the rule. As articulated by the NRC in the statement of considerations for the proposed aircraft impact rule, and reiterated in the statement of considerations for the final rule, detailed information on the aircraft impact characteristics would be useful (perhaps even indispensible) to persons or entities with malevolent intent who seek to attack a nuclear power plant with an aircraft. Such information is, accordingly, designated as SGI or secret information, and must be withheld from the general public. The NRC's rationale in withholding such information and not including it in the aircraft rule language itself appears to have been recognized and accepted as a valid basis by nearly all the other commenters who addressed the issue.

The fact that information on the characteristics of the aircraft used in the attacks of September 11, 2001 is publicly available does not, in the NRC's view, have any particular connection to the detailed information on aircraft impact characteristics that the NRC is withholding from the general public as either SGI or secret information. In the absence of NRC's disclosure of its guidance on aircraft impact characteristics, the detailed information and values for the aircraft impact characteristics would be a matter of pure speculation by a person or entity of malevolent intent, which is precisely what the NRC desires. Moreover, the information being withheld by the NRC addresses more than just the characteristics of the aircraft; it also addresses characteristics and parameters of the *impact* of the aircraft on the facility. A person's speculation that the publicly-withheld NRC guidance on *aircraft characteristics* is essentially the same as the publicly available characteristics of the aircraft used in the attacks of September 11, 2001 would not be useful in determining what *impact characteristics* the NRC will require a nuclear power plant designer to assume when conducting the aircraft impact assessment under the rule.

In conclusion, the NRC declines to adopt the commenter's proposal that the detailed aircraft impact characteristics be incorporated into the aircraft impact rule language, and thereby make those characteristics publicly available. No change was made to the final rule as a result of this comment.

Comment: The aircraft parameters should be publicly available. Placing the specific parameters to use for the analysis in separate guidance documents is unnecessary and fundamentally undermines the value of the "rule" and unnecessarily prevents meaningful involvement from the public and experts in industry and academia. With the values associated with the specific parameters in guidance documents, applicants are not required to use them. The proposed rule would allow an applicant to use any values for the parameters as long as they conform to the general characteristics set forth in the rule. (Coldren-8-2a)

NRC Response: The NRC disagrees with the commenter's assertion that placing the specific parameters and values in a separate guidance document which is withheld from general public disclosure *unnecessarily* prevents meaningful involvement with the public and experts in industry and academia. As discussed in response to other comments and as articulated in the statement of considerations for the proposed rule, the NRC's decision to place the detailed information on the airplane impact characteristics in a guidance document is grounded on the NRC's need to protect information that could be utilized by persons or entities with malevolent intent. To the extent that this impedes comment on the detailed guidance, the NRC regrets that it is necessary. However, the NRC points out that experts in industry and academia did have the benefit – as did all members of the general public – of the requirements for the aircraft impact characteristics specified in the rule. Those experts and academicians were free to utilize their own expertise, knowledge, and analytical capabilities to develop their own proposals for aircraft impact characteristics articulated in the rule, and suggested detailed parameters and values that would implement their proposals, which could be used by the NRC in the development of the regulatory guidance implementing the aircraft impact rule. If those detailed recommendations for parameters and values itself represented, in the assessment of the commenter, sensitive unclassified information or SGI, the commenters could have followed NRC's existing procedures for identifying such information and submitting public and non-public versions of the comments. In sum, the NRC does not believe that any industry expert or academician was inhibited in providing meaningful comments on the proposed aircraft impact rule on the basis of the NRC's decision to put the detailed, implementing information on aircraft impact characteristics in a non-public document.

The NRC agrees with the commenter that any specific parameter values which may be contained in the guidance documents are not legally binding upon the designers subject to the aircraft impact rule. There are, however, practical considerations facing future nuclear power facility designers which should, for the most part, lead them to use the NRC's guidance. If the designer chooses to use parameter values and assumptions which differ from the NRC's guidance, that designer bears the burden of proof for convincing the NRC that their alternative values and assumptions are acceptable. The NRC's review of that design will likely require more time and resources, which may extend the schedule and cost for completing the NRC's review and approval of the design. Such considerations may well limit most designers from utilizing aircraft impact characteristics which depart from the NRC guidance. Thus, the NRC disagrees with the commenter's conclusion that such withholding "fundamentally undermines" the value of the rule.

For the reasons set forth above, the NRC disagrees with the comment that the process used by the Commission in withholding detailed information on the aircraft impact characteristics inhibited meaningful public comment, or that the approach chosen results in a meaningless regulatory requirement with no practical effect. No change was made to the final rule as a result of this comment.

Comment: The NRC should release all publicly available, non-classified, non-safeguards documents in their entirety submitted as part of public comments on the proposed rule, consistent with the Federal Register notice of proposed rulemaking for the aircraft impact rule, which stated, "Comments on rulemaking submitting in writing or in electronic form will be made available in their entirety on the NRC rulemaking Web site." The information in the attachment,

which is non-classified, non-Safeguards, and according to the NRC, is of "marginal value to potential adversaries," contains information which is "of considerable value to [the commenter's] positions." (Beyond Nuclear-3-1a, UCS-29-1)

NRC Response: The NRC has reviewed all of the information submitted by commenters on the proposed rule in accordance with established procedures and has determined that they do not contain information which must be withheld from public disclosure. Accordingly, the NRC has made the information available to the public. This comment did not propose any change to be included in the final rule. Therefore, no change was made to the final rule as a result of this comment.

Comment: The NRC should release all publicly available documents in their entirety that were docketed in Local Public Document Rooms (LPDR) and the NRC's central Public Document Room (PDR) as pertain to the proposed rulemaking and the issue of aircraft hazards. (Beyond Nuclear-3-1b).

NRC Response: The NRC interprets the comment as requesting that the NRC release to the public every document that may be relevant to the proposed rulemaking and the issue of aircraft hazards *in its entirety*. Presumably, the commenter opposes the NRC's current procedures and practice for withholding portions of documents containing sensitive, SGI, or classified information (or which may be withheld as permitted or required by relevant statutes and law). The NRC disagrees with the commenter's suggestion. The NRC is required by law to protect SGI and classified information from public disclosure. Furthermore, the NRC believes that it is prudent to protect sensitive, albeit unclassified or non-SGI information, from general public disclosure. The commenter presented no reason why the NRC should depart from its practices and procedures with respect to information pertaining to the proposed aircraft impact rule and the issue of aircraft hazards. Accordingly, the NRC declines to adopt the commenter's suggestion.

The commenter proposes that the NRC take action which is unrelated to the subject matter of this rulemaking, and does not suggest any change to the proposed aircraft impact rule. Therefore, no change was made to the final rule as a result of this comment.

Comment: In 2006, the NRC staff prepared a proposed rule that would have required future applicants for construction permits, operating licenses, standard design approvals, standard design certifications, combined licenses, and manufacturing licenses to perform a security design assessment. However, according to Commissioner McGaffigan's voting record for that rule, the NRC staff's rulemaking was significantly altered based upon a letter from NEI. Although Commissioner McGaffigan claimed the NRC staff's proposal was more stringent than that submitted by NEI, the public is unable to verify this claim inasmuch as the NEI letter is being withheld from the public. (Greenpeace-19-4b)

NRC Response: The commenter is incorrect in the assertion that the NEI letter was being withheld from the public. The NEI letter of December 8, 2006, was made available for public viewing in ADAMS (ML070040025) in January 2007. The draft proposed security assessment rulemaking, in SECY-06-0204 (September 28, 2006) was also publicly available through the NRC website under the Commission's document collection. Nevertheless, whether or not the NRC staff's recommendations on an earlier rulemaking were more or less stringent than what

NEI proposed in its December 8, 2006 letter is irrelevant to the issues raised in this rulemaking. This comment did not propose any change to be included in the final rule, and, therefore, no change was made to the final rule was made as a result of this comment.

Comment: Applicants should submit a summary level description and not details of the design features and mitigation actions as part of the application. Submitting the details would be inconsistent with the treatment of the other specific beyond design-basis requirements listed in Part 52. In addition, for aircraft impact, it would result in the submittal being classified as a Safeguards document. Consistent with the treatment of submittals on other specific beyond design-basis events, the details would be available for NRC audit and inspection. (NEI-23-14)

NRC Response: The NRC generally agrees with the commenter that applicants should submit a summary level description of the design features and functional capabilities as part of their application, consistent with the treatment of other beyond-design-basis requirements in 10 CFR Part 52. However, the NRC does not agree that applicants should base their decision about the level of detail to include in their application on whether that level of detail would be considered SGI. Although it may be desirable to limit the amount of information in an application classified as SGI to allow the public access to as much information as possible, applicants must be guided by the requirements of the final rule in determining what level of information is necessary to include in their applications. If portions of the application must contain safeguards information, then the applicant must follow 10 CFR 2.390, "Public inspections, exemptions, requests for withholding," and existing NRC procedures and guidelines on transmitting that information to the NRC. No change was made to the final rule as a result of this comment.

X. Compliance with the National Environmental Policy Act (NEPA)

Comment: The NRC must prepare an EIS examining the environmental effects of its rulemaking, including its exclusion of currently-operating power reactors and currently approved design certifications, because the proposed rule is a "major federal action." The proposed rule is a major federal action because it bears directly on the degree to which public health and the environment will be protected against the impacts of aircraft attacks. This is supported by a decision of the U.S. Court of Appeals for the 9th Circuit in ***San Luis Obispo Mothers for Peace v. NRC****, 449 F3d 1016 (2006)(SLOMP). In SLOMP, the 9th Circuit ruled that the NRC's decision to categorically exclude the potential impacts caused by an attack on a dry cask storage system was irrational given the NRC's recognition (elsewhere) of the possibility of such intentional actions (NYS AG-17-5a)*

NRC Response: The NRC disagrees with the commenter that an environmental impact statement (EIS) must be prepared for this rulemaking. The commenter incorrectly believes that the NRC determination not to prepare an EIS for the proposed aircraft impact rule was based upon a conclusion that the rulemaking does not constitute a "major federal action." In fact, the NRC's determination was based upon the conclusion that the proposed rulemaking was not a major federal action *significantly affecting the environment.* As discussed in the environmental assessment (EA), the NRC determined that there would be no adverse environmental impacts attributable to the rule *per se*, inasmuch as: (i) the rule applies to designers of nuclear power reactors, and a design, by itself, does not have any effect upon the environment unless it is

utilized in a reactor that is being built; (ii) the rule's requirements do not affect the nuclear power plant's capabilities with respect to radiological releases from design bases events, including postulated accidents; (iii) the standards and requirements applicable to radiological releases and effluents are not affected by this rulemaking, and would therefore have no adverse environmental impact. Finally, although not mentioned in the EA, the NRC believes that this rule has the potential effect of increasing environmental protection by requiring reactor designers to consider and implement design features and functional capabilities to address aircraft impacts. By doing so, there would be a potential decrease in the possibility of radiological releases to the environment stemming from an aircraft impact on a nuclear power plant, which effectively increases the level of environmental protection provided. The EA was made available to the public for comment as part of the notice and comment opportunity for the proposed rule. The commenter provided no specific analysis of that discussion in the EA, nor did the commenter identify any error in the EA that would lead to the conclusion that the proposed rule would significantly affect the environment. The NRC is issuing a revised EA with the final rule to reflect the last rationale mentioned above.

The 9th Circuit decision cited by the commenter is inapposite to the NRC's decision not to prepare an EIS for the proposed aircraft impact rule. In SLOMP, the 9th Circuit decision addressed the four reasons presented by NRC as to why an EIS for a proposed NRC issuance of a license for an independent spent fuel storage installation (ISFSI) need not address the potential environmental impacts of an attack on the ISFSI. The NRC's bases, as articulated by the 9th Circuit, were that: (1) such attacks were remote and speculative; (2) an analysis of the probability of such attacks would be meaningless; (3) NEPA does not require a worst-case analysis; and (4) NEPA is not an appropriate forum for addressing sensitive security issues. These matters did not involve the issue of whether issuance of a license for the ISFSI significantly affected the environment. Moreover, the SLOMP decision involved the exercise of NRC's licensing authority, rather than its rulemaking authority. For these reasons, the NRC believes that the 9th Circuit's decision in SLOMP is of no relevance to, and does not address, whether the aircraft impact rule requires preparation of an EIS.

The NRC continues to believe that adoption of the proposed rule does not constitute a major federal action significantly affecting the environment. Therefore, an EIS was not prepared for the final aircraft impact rulemaking. No change was made to the EA or the Finding of No Significant Impact as a result of this comment.

Comment: The EIS for the proposed rule must consider alternatives to the proposed rule which would reduce the environmental impacts attributable to an aircraft impact on a nuclear power plant and spent fuel facilities [located at the plant]. (NYS AG-17-5b)

NRC Response: The NRC disagrees. Inasmuch as the NRC concludes that the proposed aircraft impact rule, if implemented, would not constitute a major federal action significantly affecting the environment, there is no legal requirement under NEPA to consider alternatives to the proposed rule, including alternatives which, arguably, may result in more diminished effects on the environment as compared with the proposed rule. No change was made to the EA or the Finding of No Significant Impact as a result of this comment.

Comment: The NRC must prepare an EIS, because the NRC has an affirmative duty to carry out NEPA's mandate for full public disclosure of reasonably foreseeable environmental effects

that may result from federal actions or approvals. (NYS AG-17-5c)

NRC Response: The NRC disagrees. Under NEPA, the NRC's obligation to prepare an EIS which fully discloses reasonably foreseeable environmental effects applies only to *major* federal actions *significantly affecting the environment*. As set forth in the draft EA and summarized in the NRC's responses to comments above, the NRC does not believe that the aircraft impact rule, if adopted, constitutes such an action. Accordingly, the NRC is not required by NEPA to prepare an EIS for this rulemaking. No change was made to the final rule as a result of this comment.

XI. Other Comments

Comment: If the proposed rule is adopted, then new nuclear power plants should also be designed to consider impacts from near earth orbital objects, such as meteors and comets, even though such impacts are not credible. (Halac-1-4)

NRC response: The NRC believes that the commenter's suggestion was not intended to be a serious request for rulemaking. Rather, the NRC believes that the comment was intended to provide support for the commenter's position that the proposed rule should not be adopted, implicitly equating the lack of credibility of impacts from near earth objects to the commenter's belief of the lack of credibility of large aircraft impacts on nuclear power plants. Accordingly, the NRC will not treat this comment as a petition for rulemaking.

With respect to the commenter's implicit assertion that large aircraft impacts on a nuclear power plant are not credible, the NRC notes that the commenter did not provide any basis for this assertion. The commenter's argument also appears to be based upon the belief that such impacts may occur only to deliberate action – *i.e.,* the actions of a terrorist – and consequently, the proposed rule's benefits are limited to aircraft impacts due to terrorist action. The NRC disagrees. The NRC staff, as well as interested persons in a nuclear power plant licensing hearing, have raised questions about the capability of nuclear power plants located near airports to withstand the effects of commercial and military aircraft which accidentally crash into the containment. While such impacts are outside of the design basis of current nuclear power plants, the NRC believes that substantial additional protection to public health and safety and common defense and security may result by requiring future designs to be assessed in accordance with the aircraft impact rule. For these reasons, the NRC disagrees with the commenter's implicit assumption that the benefits of the proposed rule are limited to aircraft impacts due to terrorist action. No change was made to the final rule as result of this comment.

Comment: The NRC's remarks that no one could have predicted four airplanes flying into buildings in New York City reflects a lack of institutional memory, inasmuch as the issue of airplanes flying into nuclear power plants was a contention in the Three Mile Island, Unit 2 hearings. (Marvin Lewis)

NRC response: The NRC disagrees with the comment. The contention in the Three Mile Island, Unit 2 (TMI-2) operating license proceeding concerned the possibility and consequences of an accidental impact of a commercial aircraft on that facility. By contrast, the NRC's statement was referring to the events of September 11, 2001, where a group of individuals

deliberately flew an airplane into the World Trade Center buildings in New York City.

In any event, the proposed rule does not make any distinction between accidental or deliberate impacts of an airplane. No change was made to the final rule as a result of this comment.

Comment: The NRC should not allow new reactors to be built within five miles of an airport. (TMI Alert-12-13)

NRC Response: This comment addresses criteria governing the siting of nuclear power plants. This topic is outside the scope of this proposed rulemaking. No change was made to the final rule as a result of this comment.

Comment: The proposed rule should include siting criteria which are based upon siting criteria developed by the International Atomic Energy Agency (IAEA). (Schmidt-6-2)

NRC Response: This comment addresses criteria governing the siting of nuclear power plants. This topic is outside the scope of this proposed rulemaking. No change was made to the final rule as a result of this comment.

Comment: The NRC has no real means of determining if current plants can extinguish a large fire caused by an aircraft impact. The same would be true for new reactor designs. Therefore, the NRC's reliance upon the designers and licensees assessments is ineffective and represents a significant safety threat. At a recent meeting with Exelon representatives at Three Mile Island, I was told that they could handle an aircraft fire without outside assistance. That certainly was a grandiose "pipe dream." TMI required offsite assistance with several small fires in recent years. (TMI Alert-12-14)

NRC Response: This comment addresses whether current nuclear power plant operators possess the capability to extinguish a large fire caused by an aircraft impact (with or without outside assistance). This topic is outside the scope of this proposed rulemaking. Moreover, the NRC has, apart from this rulemaking, taken a series of regulatory actions directed at current nuclear power plant operators to address their capability to safely withstand fires and explosions which may affect large portions of the plant. Insofar as this comment may be interpreted as questioning the lack of effective NRC action on the subject of large fires at nuclear power plants that may be caused by, among other things, an aircraft impact, the NRC disagrees with the commenter. No change was made to the final rule as a result of this comment.

Comment: The father of the nuclear navy, Admiral Rickover, was ultimately against commercial nuclear power and testified to Congress that nuclear power plants should not be constructed. (TMI Alert-12-17)

NRC Response: Regardless of the views of Admiral Rickover, Congress has determined, as reflected in the Atomic Energy Act of 1954, as amended (AEA), that commercial nuclear power plants may be constructed, but only under the regulatory oversight of the NRC, and only if each facility is not inimical to the public health and safety and common defense and security. The NRC carries out its statutory authority by conducting the licensing and continuing regulatory oversight of nuclear power plants in accordance with the statutory requirements of

the AEA and all other applicable federal statutory requirements. No change was made to the final rule as a result of this comment.

Comment: The proposed rule making should be expanded (or the NRC institute new rulemaking) to similar attacks by water as virtually every reactor lies adjacent to rivers, lakes and open oceans. Ships and boats are capable of launching weapons directly at current and proposed nuclear reactors, intake systems, irradiated fuel pools and onsite high-level radioactive waste storage casks. The consequences of such an attack(s) could be comparable to air attack and deserve the Nuclear Regulatory Commission's full attention. (A4NR-9-2; Sierra-20-2)

NRC Response: The proposed rule addresses impacts by aircraft. Attacks initiated from ships and boats are beyond the scope of the proposed rule, and the NRC does not believe that the rulemaking should be expanded to address attacks from ships and boats. Moreover, in its DBT rulemaking (72 FR 12705; March 19, 2007), the NRC amended its requirements in 10 CFR 73.1 for licensees to protect the facility against waterborne acts of radiological sabotage. No change was made to the final rule as the result of this comment.

Comment: The proposed rule should require consideration of air attacks by means other than aircraft, such as missiles, mortars or artillery. Terrorists have the capability to use such means of air attack, as shown by attacks on US troops in Iraq and Afghanistan. The NRC does not explain why these threats are not addressed in the proposed rule. Unless the NRC can explain why only one mode of air attack is consistent with maximizing the security of nuclear power plants, any regulation addressing air attack must address all modes. (Northern Lights-18-1, Halac-1-9)

NRC Response: The NRC disagrees with the commenter that the NRC must explain, as part of the rationale for this rulemaking, why other possible threats ("air attacks") need not be addressed through rulemaking. The proposed rule addresses impacts by large, commercial aircraft. Missiles, mortars and artillery constitute projectiles, as opposed to piloted aircraft - which is the focus of the aircraft impact rule. The considerations involved in determining whether and how to protect a facility against projectiles are different from those involving piloted craft. Moreover, missiles, mortars and artillery are primarily ground-launched by an attacking force. Regulatory consideration of missiles, mortars and artillery would be more appropriate in the context of the design basis threat under 10 CFR Part 73. However, in its DBT rulemaking (72 FR 12705; March 19, 2007), the NRC considered these types of projectiles and did not include them as design basis threats to nuclear power plants. The NRC declines to re-open this matter on the basis of this comment.

In sum, protection of a nuclear power plant against the use of missiles, mortars and artillery are beyond the scope of this rulemaking. The NRC does not believe that the rulemaking should be expanded to address attacks using such projectiles. No change was made to the final rule as a result of this comment.

Comment: The NRC's long-standing failure to require nuclear reactor licensees to address aircraft threats suggests the need for a separate federal advisory committee to review the adequacy of new nuclear reactor designs. The NRC has repeatedly failed to take action to address the terrorist threat of aircraft impacts. The NRC and the industry continues to mislead

the public about both the potential for and consequences of a terrorist aircraft attack on a nuclear power plant. Contrary to NRC's public claims about the robustness of containments, an Argonne study, NUREG/CR-2859, which is no longer available to the public, shows that the impact of a Boeing 707-320 on the containment is more severe than that due to an earthquake. The Argonne study also shows that other parts of the reactor not protected by the containment would be vulnerable, such as the switchyard, which would eliminate offsite power, which would leave the plant vulnerable to core melt. Furthermore, the Argonne study concluded that the effects of fire and explosion hazards have been treated with "less care that the direct aircraft impact and structural response." In light of the NRC's lack of action, a federal advisory committee, rather than the NRC should review of the adequacy of nuclear plants to address aircraft threats. (Greenpeace-19-4a)

NRC Response: The NRC disagrees with the implicit suggestion of the commenter that delaying the proposed rule to await the results of a study performed by a federal advisory committee would be more effective in assuring the safety of future nuclear power reactors. The NRC is already reviewing several new design certification applications. It is unlikely, even if the NRC were to decide that a federal advisory committee should be constituted, that it would be possible to obtain a report from the committee and act on any recommendations within a time frame that would affect these near term designs. Therefore, the NRC declines to adopt the implicit suggestion of the commenter to delay promulgation of the aircraft impact rule until a federal advisory committee has been established and a report issued on the subject of aircraft impacts. No change was made to the final rule as a result of this comment.

Comment: The assessment of the impact of a large, commercial aircraft under the proposed rule should be performed as part of a multi-hazard assessment of the nuclear power plant. (Weidlinger-16-5)

NRC Response: The NRC interprets the comment as suggesting that the aircraft impact assessment must be conducted as part of the design evaluations performed to comply with NRC's existing technical requirements governing consideration of design basis events. The NRC disagrees with this suggestion. The assessment and evaluation which would be required by the proposed aircraft impact rule is not a design basis evaluation, and need not be done utilizing the typical approaches used for designing structures, systems, and components to address design basis events, *e.g.*, use of conservative (as opposed to realistic) assumptions, and application of 10 CFR Part 50, Appendix B requirements to the assessment and evaluation process. No change was made to the final rule as a result of this comment.