

**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. In addition, these comments may be viewed and downloaded electronically through the Federal e-Rulemaking Portal <http://www.regulations.gov>, Docket number NRC-2007-0009. 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 Accession No. ML082460559). 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 Requests for Comments**

In Section VIII of the Supplementary Information for the proposed aircraft impact rule (72 FR 56287; October 3, 2007), 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 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 final rule does not require that the assessment of aircraft impacts be included in the preliminary safety analysis report (PSAR) or FSAR or otherwise submitted as part of the application for a construction permit, operating license, standard design certification, standard design approval, combined license, or manufacturing license. However, 10 CFR 50.150(b) does require that a description of the design features and functional capabilities credited by the applicant to show that the facility can withstand the effects of the aircraft impact be included in the PSAR or FSAR submitted with the relevant application. In addition, the PSAR or FSAR must contain a description of how such design features and functional capabilities meet the acceptance criteria in 10 CFR 50.150(a)(1). The aircraft impact assessment will be subject to inspection by the NRC and, therefore, must be maintained by the applicant along with the rest of the information that forms the basis for the relevant application. The NRC expects that, generally, the information that it needs to perform its review of the application to assess the applicant's compliance with 10 CFR 50.150 will be that information contained in the applicant's PSAR or FSAR. For these reasons, the final rule does not require applicants to submit the aircraft impact assessment to the NRC.

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

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

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

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

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

- For a standard design certification, combined license, and manufacturing license the period of NRC review prior to NRC final action on the application.
- For a standard design certification and manufacturing license, the duration of the design certification or manufacturing license (i.e., the period during which the design certification or manufactured reactor may be referenced, including any renewal).

- For a standard design certification or manufacturing license, until the licensee of the final referencing license has submitted a certification under 10 CFR 50.82(a), or the final referencing license has been terminated.
- For a combined license, when the licensee has submitted a certification under 10 CFR 50.82(a), or the combined license has been terminated.

*Commenters' Response: All the industry commenters (NEI, Morgan Lewis, and AREVA NP) who commented on this question stated that the existing NRC records retention requirements are sufficient. AREVA NP also stated that the records retention requirements should apply to design certification holders for the 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 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. The NRC is unable to identify any factors unique to aircraft impact rule compliance that would lead it to adopt a different record retention scheme.

4. *Requests to amend existing standard design certifications to address aircraft impacts.* The NRC has concluded that it does not need to apply the proposed rule to the four currently approved standard design certifications, as discussed in detail in Section III of the Supplementary Information of the proposed rule. Nonetheless, the original applicant (or 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 the proposed rule. However, under the proposed rule, there are no standards, other than those contained in 10 CFR 52.63(a), for judging changes to the design to address the effects of an aircraft impact. The NRC requests specific comments on whether it should use the same criterion to judge amendments to an existing design certification as it would use on a new design certification applicant under the proposed 10 CFR 52.500.

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

The NRC's decision on the regulatory approach for achieving the objective that all newly-designed and constructed nuclear power plants comply with the aircraft impact rule stems from: (1) NRC's acknowledgement of the view - expressed by a wide range of stakeholders—that public confidence in future nuclear power reactors will be enhanced by requiring all newly—constructed nuclear power plants, including those based upon one of the four currently approved design certifications, to meet the requirements of the aircraft impact rule; and (2) NRC's assessment that there appears to be little or no commercial interest at this time by domestic United States (U.S.) entities in using certain design certifications. The NRC agrees with the view, expressed by many stakeholders across a wide spectrum of interests and background, that the underlying objectives of the aircraft impact rule would not be fully achieved if a subset of future nuclear power plant applicants—namely, those applicants who reference one of the four existing design certifications—are not required to comply with the aircraft impact rule. Thus, the NRC has decided that all future nuclear power plants to be constructed and operated in the U.S. should use designs which comply with the final aircraft impact rule. However, given that objective, the NRC believes that it should adopt a regulatory approach for achieving that objective in a manner that does not unduly affect the resource

planning of potential combined license applicants considering referencing one of the currently approved design certifications. To adopt a regulatory approach which mandates a delay in NRC action on a combined license application referencing one of the four currently approved until that design certification is amended to comply with the aircraft impact rule seems unduly restrictive, especially where the combined license applicant is ready and willing to comply with the aircraft impact rule. Accordingly, the NRC determined that it would adopt the regulatory approach reflected in the final rule.

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

*Commenters' Response: One industry commenter (NEI) recommended that future applicants for new construction permits under 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 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, ANuclear 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 10 CFR Part 50 construction permit applicants, then the requirements should be included in 10 CFR 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 when it is performing the aircraft impact assessment. Design certification, design approval, and manufactured reactor applicants will only logically be able to consider that part of the facility design within the scope of the certification, approval, or license. However, combined license applicants that do not reference a design certification, design approval, or manufactured reactor, or reference one of the four currently approved design certifications which has not been previously amended to comply with the aircraft impact rule, will have the entire facility design available for consideration. This means, as a practical matter, that the scope of the overall plant design which is subject to the

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

## **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 U.S. 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 this 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 U.S. 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 to rejection of the proposed rule. As discussed elsewhere, the primary purpose of this rule is to enhance, consistent with principles of good regulation, the 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 potential events, viz., impacts of a large, commercial aircraft.

The NRC 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 using realistic analyses (see 10 CFR 50.150(a)(1)). The ability of the reactor designer to use

realistic analyses should minimize the potential for the rule to impose an unjustifiable economic burden. Accordingly, the NRC disagrees with the commenter that the economic burden of the 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 incorporated the continuing requirement to provide for such mitigative measures in the NRC's regulations in the power reactor security requirements final rule (74 FR 13926; March 27, 2009).

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 use realistic analyses to identify and incorporate design features and functional capabilities to show, with reduced use of operator actions, that either the reactor core remains cooled or the containment remains intact, and either spent fuel cooling or spent fuel pool integrity is maintained. This new 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. 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 effects of the aircraft impact and use realistic analyses to show, with reduced use of operator actions, that either spent fuel cooling or spent fuel pool integrity is maintained. 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 to 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 incorporated the continuing requirement to provide for such mitigative measures in the NRC’s regulations in the power reactor security requirements final rule (74 FR 13926; March 27, 2009). The commenter has not demonstrated that these measures are insufficient to provide adequate protection (see NRC responses in this section 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 incorporated the continuing requirement to provide for such mitigative measures in the NRC's regulations in the power reactor security requirements final rule (74 FR 13926; March 27, 2009). In addition, the final aircraft impact rule requires relevant applicants to assess the effects of the aircraft impact and use realistic analyses to show, with reduced use of operator actions, that either spent fuel cooling or spent fuel pool integrity is maintained. 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  $1.3 \times 10^{-11}$  to  $6.0 \times 10^{-8}$  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 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 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 utilize 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: (1) requiring a combined license applicant referencing one of those design certifications to perform the assessment and identify the design features and functional capabilities in accordance with the aircraft impact rule; and (2) requiring that each of the four currently approved design certifications meet the requirements of the rule upon renewal if, at the time of renewal, the design certification has not been amended to comply with the 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 amend the design in order to meet the requirements of the aircraft impact rule, or for the individual combined license applicant referencing one of the four existing design certifications to comply with the rule. 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 utilize one of the four currently approved design certifications. The 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: (1) requiring the

combined license applicant to comply with the aircraft impact rule if the design certification has not been amended to comply with the rule, and (2) requiring the design certifications to comply with the rule at the time of renewal, if that design certification has not been amended to comply with the 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 of 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 the combined license applicant referencing one of the four currently approved design certifications to comply with the aircraft impact rule, if that certification has not been amended to comply with the rule. This leaves to the marketplace the determination as to which entity bears the cost of compliance, thereby avoiding involving the NRC in any commercial disputes between a vendor of one of the four currently approved designs and a user of those designs. The NRC also concludes that the four existing design certifications will be required to comply with aircraft impact rule at the time of renewal, if the certification has not been amended to comply with the rule. As a result, the NRC believes that the final rule achieves the underlying objective of the commenter, but in a manner that imposes less regulatory burden. 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 upon renewal if, at the time of 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. Thus, it is unnecessary to require immediate amendment of the currently approved design certifications to comply with the aircraft impact rule, in order to ensure that all newly-constructed nuclear power plants meet the requirements of that rule. The final aircraft impact rule reflects these NRC determinations.

*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. If 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 proposed 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, and 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 has decided upon a regulatory approach that leaves to the market the particular path for achieving the NRC's objective that all newly designed and constructed nuclear power plants meet the aircraft impact rule. The NRC has concluded that the best regulatory approach would be to require the combined license applicant referencing one of the four currently approved design certifications to comply with the aircraft impact rule, if that certification has not been amended to comply with the rule.

The NRC selected this regulatory approach because it believes that regulatory requirements should be imposed in a manner which achieves the NRC's objective in a manner which minimizes both the NRC's intrusion into the market, and 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. In addition, the NRC believes that, as a safety regulator, it should adopt regulatory approaches which minimize governmental intrusion into what are essentially commercial considerations for which the NRC has no apparent regulatory interest in this context. The NRC believes that the aircraft impact rule establishes a good regulatory framework for achieving the ultimate objective sought by the NRC and 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 newly-designed and constructed nuclear power plants to comply with the aircraft impact rule, including those that reference one of the four existing design certifications. However, the rule does not require that the design certifications themselves be amended to comply with the rule. That is left up to the design certification “vendor” and the referencing combined license applicant. As discussed earlier, the NRC believes, given the fact that the NRC has already reviewed and approved these designs and afforded them finality and issue resolution, that the marketplace should determine the entity to conduct the assessment and directly incur the cost of the assessment. However, upon renewal, each of the four existing design certifications will have to comply with the aircraft impact rule unless the design has been amended to comply with the rule. 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(a)(3)(iii)(B), 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 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 the 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, that is, to require the combined license applicant referencing one of the four currently approved design certifications to comply with the aircraft impact rule, if that certification has not been amended to comply with the rule. 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 been amended to comply with the aircraft impact rule. The NRC also agrees with the commenter's implicit suggestion that, in such circumstances, 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. The final rule reflects the NRC's determinations in this regard.

*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 a design-

specific assessment of the effects 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 design features and functional capabilities to show, with reduced use of operator actions, that either the reactor core remains cooled or the containment remains intact, and either spent fuel cooling or spent fuel pool integrity is maintained, will be identified and 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. y 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 impact 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 statute 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 10 CFR 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 10 CFR 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 final 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 “wobble room” for design 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 final 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 carrying 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 show that the facility can withstand 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 than 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 show that the facility can withstand 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 flights in the U.S. 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 show that the facility can withstand 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. 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 (SSCs) 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 transform 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, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants." 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 are core cooling, containment, 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 expects to endorse the assessment methods developed by NEI in a regulatory guide that will also include the SGI aircraft impact parameters that the NRC considers appropriate for applicants' 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 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 that the NRC staff expects to endorse 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 expects to endorse 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 final rule allows the use of realistic analyses, rather than the conservative assumptions used for design basis analyses. The NRC expects to endorse 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 agrees and has revised the rule language in the final rule to allow applicants to use realistic analyses. Also, 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 statement of considerations for the final rule. More details regarding the assumptions made in performing the assessment can be found in the NEI guidance document that the NRC plans to endorse.

## 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 with the commenters for the reasons outlined in the comment and has adopted final rule language requiring that applicants identify and incorporate design features and functional capabilities to show, with reduced use of operator actions, that either the reactor core remains cooled or the containment remains intact, and either spent fuel cooling or spent fuel pool integrity is maintained.

*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 final aircraft impact rule does not contain the phrase, "avoid or mitigate," which was the focus of this comment. The reasons for the removal of this phrase are set forth in the statement of considerations for the final rule. Inasmuch as the word, "avoid," does not appear in the final rule, it is unnecessary to explain what "avoid" means.



*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 required by the rule. 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 to avoid an aircraft impact, 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 PotoI (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 pursuing 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 design alternatives to show that the facility can withstand the effects of an aircraft impact if the impact assessment performed in accordance with the final rule demonstrates that the existing facility design can withstand the effects of an aircraft impact. The NRC has addressed this issue in the section-by-section analysis for 10 CFR 50.150(a), 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 and capabilities, and then identify any additional features and capabilities. In the final rule, 10 CFR 50.150(a) requires that the applicant identify and incorporate into the design those design features and functional capabilities to show that, with reduced use of operator actions, that either the reactor core remains cooled or the containment remains intact and either spent fuel cooling or spent fuel pool integrity is maintained. 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 meet the assessment requirements of the rule. 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, the spent fuel pool and core cooling systems 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 proposed rule would have imposed no substantive requirement or was too vague. Nevertheless, the NRC has revised the rule language in the final rule to require that applicants identify and incorporate design features and functional capabilities to show, with reduced use of operator actions, that either the reactor core remains cooled or the containment remains intact, and either spent fuel cooling or spent fuel pool integrity is maintained. The NRC has also added additional explanation of the aircraft impact assessment requirements in the section-by-section analysis for the final rule. Applicants are required to submit a description of the design features and functional capabilities identified and a description of how they meet the acceptance criteria in the rule. 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. Finally, the NRC notes that the fact that the rule does not require applicants to *submit* the assessment to the NRC does not make the rule “vague.” The rule simply establishes a relatively small amount of information on aircraft impact rule compliance to be submitted to the NRC.

*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 agrees, in part, with the commenter that the rule should contain specific acceptance criteria for the adoption of design features. The NRC has revised the rule language in the final rule to require that applicants identify and incorporate design features and functional capabilities to show, with reduced use of operator actions, that either the reactor core remains cooled or the containment remains intact, and either spent fuel cooling or spent fuel pool integrity is maintained. However, the NRC would not expect a designer to use a design feature or functional capability which introduces inordinate complexities in integration into the plant design or operational procedures that could cause a decrease in safety or security. 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.

*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 has removed the phrase “to the extent practicable” in the final rule, but not because it disagrees with the commenter *per se*. The NRC ultimately decided that the final rule should require applicants to show that, in the event of an aircraft impact at a nuclear power plant, the reactor core would remain cooled or the containment structure would remain intact and spent fuel cooling or spent fuel pool integrity would be maintained. With implementation of the final rule, applicants for new nuclear power reactors can use realistic analyses to assess their designs but cannot rely solely on operator actions to meet the acceptance criteria. The NRC continues to believe that subsequent generations of plants to be built in the U.S. will be inherently more capable of resisting beyond design basis events, including aircraft impacts, due to safety improvements previously incorporated into these designs. The addition of the aircraft impact rule, revised to include specific acceptance criteria, will provide additional public confidence that all reasonable design measures were taken to add additional margin beyond the adequate protection standard that is being met through compliance with 10 CFR 50.54(hh). The addition of specific acceptance criteria to the aircraft impact rule adds regulatory stability and predictability that is not achievable with criteria that must only be met “to the extent practicable.” Acceptance criteria that are based on functional requirements provide a benchmark that can be assessed for the purpose of determining compliance with this rule, yet provide the distinction necessary to keep enhancements implemented for a beyond-design-basis event separate from design requirements necessary to meet 10 CFR Part 100, “Reactor site criteria.”

*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 has removed the phrase “to the extent practicable” in the final rule for the reasons specified above in the response to comment 23-9 from NEI.

*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 should also be reasonable from a cost effectiveness standpoint.” 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 reasonable cost.” 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 has removed the phrase “to the extent practicable” in the final rule, but not necessarily because it disagrees with the entire thrust of the commenters’ views. For the reasons stated above in the response to comment 23-9 from NEI, the NRC ultimately decided that the final rule should require applicants to meet specific acceptance criteria when evaluating what design features and functional capabilities to incorporate into the design to show that the facility can withstand the effects of an aircraft impact. However, the final rule allows applicants to use realistic analyses. Regardless of the method or combination of methods employed by the designer, the assessment must be reasonable and technically acceptable. This can be shown by demonstrating that the analytical techniques being used are generally accepted by the relevant professional/technical practitioners for performing best-estimate analysis for the given application. In this context, “realistic” is a relative term and is intended to avoid requiring the designer to utilize conservative or bounding assumptions in recognition of the NRC’s determination that the impact of a large, commercial aircraft is a beyond-design-basis event. The NRC believes that allowing the use of realistic analyses will provide the designer with flexibility in identifying design features that meet the acceptance criteria of the rule without being cost-prohibitive.

*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: For the reasons stated above in the responses to comments 23-9 and 23-12.a from NEI, the NRC has removed the phrase “to the extent practicable,” in the final rule. This is the language that the commenter referred to as implying cost could be considered in selecting design features to comply with the rule.

*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 by 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 has 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 questioned how this could be independently verified. There is no way to test an undefined and asymmetrical threat. (Halac-1-6)*

NRC Response: The NRC first notes that the final rule includes specific acceptance criteria, albeit, not ones that the commenter would likely favor. 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 type of event 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 final rule requires incorporation of design features and functional capabilities to show (using realistic analyses), with reduced use of operator actions, that: (1) the reactor core remains cooled or the containment remains intact; and (2) spent fuel cooling or spent fuel pool integrity is maintained. The 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 withstand 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.

*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. Instead, the final rule requires incorporation of design features and functional capabilities to show (using realistic analyses), with reduced use of operator actions, that: (1) the reactor core remains cooled or the containment remains intact; and (2) spent fuel cooling or spent fuel pool integrity is maintained.

The 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. Additional guidance regarding the parameters of the aircraft impact assessment will be provided in regulatory guidance.



*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 changed this terminology slightly in the final rule, which requires that applicants identify design features and functional capabilities that meet the acceptance criteria with "reduced use of operator action." Nevertheless, the NRC agrees in part with the commenter that the final rule should provide more information on what is meant by "reduced use of 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 meet the acceptance criteria with "reduced use of operator action." This means that active operator intervention and initiation of responsive action to maintain core cooling or an intact containment, and spent fuel cooling or spent fuel pool integrity should be reduced. The designer need not strive to achieve the absolute minimum in operator action. The NRC recognizes that there may be countervailing considerations that weigh against reducing to the absolute minimum the use of operator action to show that the acceptance criteria in the aircraft impact rule are met. The NRC expects the designer to identify and consider in a reasonable process the goal of incorporating design features and functional capabilities which achieve the acceptance criteria with reduced use of operator action. "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 agrees, in part with the commenter. The NRC ultimately decided that the final rule should require applicants to show that, in the event of an aircraft impact at a nuclear power plant, the reactor core would remain cooled or the containment structure would remain intact and spent fuel cooling or spent fuel pool integrity would be maintained. With implementation of the final rule, applicants for new nuclear power reactors can use realistic analyses to assess their designs but cannot rely solely on operator actions to meet the acceptance criteria. However, as discussed in the statement of considerations for the final rule and in responses to comments above, the impact of a large, commercial aircraft is a beyond-design-basis event and therefore the aircraft impact assessment requirements are not considered necessary for reasonable assurance of adequate protection to public health and safety. The NRC continues to believe that subsequent generations of plants to be built in the U.S. will be inherently more capable of resisting beyond-design-basis events, including aircraft impacts, due to safety improvements previously incorporated into these designs. Nevertheless, the addition of specific acceptance criteria to the aircraft impact rule adds regulatory stability and predictability that is not achievable with criteria that must only be met "to the extent practicable." Acceptance criteria that are based on functional requirements

provide a benchmark that can be assessed for the purpose of determining compliance with this rule, yet provide the distinction necessary to keep enhancements implemented for a beyond-design-basis event separate from design requirements necessary to meet 10 CFR Part 100, "Reactor site criteria."

*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<sup>1</sup> in addressing the requirements of the rule and, therefore, may be selected by a nuclear power plant designer for inclusion in its design, neither the proposed nor the final rule requires, 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.<sup>2</sup>

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.

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<sup>1</sup> 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.

<sup>2</sup> 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.

*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 withstand 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 show with reduced use of operator actions, that the facility can withstand 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 (also addressed in Section I of this document).

### VIII. Issue Resolution, and Regulatory Implementation Issues

*Comment: The NRC should clarify that its review of the assessment<sup>3</sup> 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: (1) the draft rule language should be revised to explicitly acknowledge that the assessment and evaluation are both accorded issue resolution; (2) 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 (3) 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, but such issue resolution is not confirmed explicitly (either in 10 CFR 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 CFR 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)*

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<sup>3</sup>The NRC interprets the commenter’s position as extending to both the assessment required by proposed 10 CFR 52.500(b), as well as the evaluation required by proposed 10 CFR 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.

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: (1) 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; (2) 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 (3) 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. This language is retained in the final aircraft impact rule in 10 CFR 50.150(c)(4).

*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 aircraft 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 the presence of design

features and functional capabilities incorporated into a design certification as a result of the aircraft impact rule provides a basis for excluding consideration of these features and capabilities during the staff's review against the physical security requirements in 10 CFR Part 73 in a combined license proceeding where the design certification is referenced. The commenter's position appears to be based upon a misapprehension of the nature of the aircraft impact assessment required by the rule, and therefore the nature of issue resolution associated with the aircraft impact assessment in a design certification. The aircraft impact rule is a safety rule and does not require consideration of physical security concerns in the required assessment. Accordingly, the issue resolution associated with an NRC finding of compliance with the aircraft impact rule does not extend to physical security concerns, nor does that finding obviate the need for the combined license applicant to consider (take into account) these design features and functional capabilities when developing the physical security measures for the site.

The NRC's position is that a combined license applicant, when developing the physical security program and procedures, should consider the design features and functional capabilities incorporated into the referenced design certification to comply with the aircraft impact rule. However, the NRC does not intend that the combined license applicant alter the design features and function capabilities incorporated into the referenced design certification as part of its combined license application to comply with physical security requirements. The objective is to encourage a COL applicant to account for (and, possible, "utilize") these already-approved design features and functional capabilities in addressing the applicable NRC physical security requirements.

However, COL applicants should also recognize that referencing a certified design that meets the aircraft impact rule acceptance criteria does not insulate the application from review for compliance with the applicable physical security requirements. The NRC's standards for protection against the design basis threat found at 10 CFR 73.1 as well as the specific measures described in 10 CFR 73.55 must also be satisfied, and the NRC staff will review COL applications to ensure that those requirements are met. To the extent that a certified design does not address or meet those requirements, the COL applicant would be obligated to meet them through other additional design or programmatic security measures.

For these reasons, 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" for physical security purposes 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 parameters (“design basis scenarios”<sup>4</sup> in the words of the commenter) 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 detailed parameters on aircraft impact characteristics has been and 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

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<sup>4</sup> The NRC notes that the final rule (as the proposed rule) does 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.

aircraft impact, 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 and 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. The 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 provide reasonable assurance of adequate protection to public health and safety, and are not inimical to the common defense and security. The NRC has recently adopted the Power Reactor Security Rulemaking (74 FR 13926; March 27, 2009) that, in part, codifies security requirements similar to those that had previously been imposed by those orders. This significant rulemaking has occurred with many opportunities for external stakeholder involvement. A proposed power reactor security rule 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. In light of the extent of NRC's public outreach for both the aircraft impact rule and the Power Reactor Security Rule, the NRC does not agree with the commenter's view that the NRC has abused the public trust.

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). However, in response to this and other comments, the NRC has revised the language of the final rule to include two sets of acceptance criteria, in 10 CFR 50.150(a)(1)(i) and (ii). The NRC believes that this level of description of acceptance criteria is sufficient to provide regulatory efficiency, predictability and transparency, as well as enhance public confidence in the safety of newly-designed nuclear power plants.

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 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 indispensable) 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 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 9<sup>th</sup> Circuit in **San Luis Obispo Mothers for Peace v. NRC**, 449 F3d 1016 (2006)(SLOMFP). In SLOMFP, the 9<sup>th</sup> 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: (1) 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; (2) 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; (3) 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 for the proposed rule, 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 9<sup>th</sup> 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 SLOMFP, the 9<sup>th</sup> 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 9<sup>th</sup> 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 SLOMMP decision involved the exercise of NRC’s licensing authority, rather than its rulemaking authority. For these reasons, the NRC believes that the 9<sup>th</sup> Circuit’s decision in SLOMFP 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 aircraft impact rule, when implemented, will 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 airplanes 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 rulemaking 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 U.S. 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 than 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.