[7590-01-P]

Nuclear Regulatory Commission

10 CFR Part 51

RIN 3150-AD63

Environmental Review for Renewal of Nuclear Power Plant Operating Licenses

AGENCY: Nuclear Regulatory Commission.

ACTION: Final Rule.

SUMMARY: The Nuclear Regulatory Commission (NRC) is amending its regulations regarding environmental protection regulations for domestic licensing and related regulatory functions to establish new requirements for the environmental review of applications to renew the operating licenses of nuclear power plants. The amendment defines those environmental impacts for which a generic analysis has been performed that will be adopted in plant-specific reviews for license renewal and those environmental impacts for which plant-specific analyses are to be performed.

The amendment improves regulatory efficiency in environmental reviews for license renewal by drawing on the considerable experience of operating nuclear power reactors to generically assess many of the environmental impacts

that are likely to be associated with license renewal. The amendment also eliminates consideration of the need for generating capacity and of utility economics from the environmental reviews because these matters are under the regulatory jurisdiction of the States and are not necessary for the NRC's understanding of the environmental consequences of a license renewal decision. The increased regulatory efficiency will result in lower costs to both the applicant in preparing a renewal application and to the NRC for reviewing plant-specific applications and better focus of review resources on significant case specific concerns. The results should be a more focused and therefore a more effective NEPA review for each license renewal. The amendment will also provide the NRC with the flexibility to address unreviewed impacts at the site-specific stage of review and allow full consideration of the environmental impacts of license renewal.

EFFECTIVE DATE: 30 days after publication in the Federal Register)

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I. Introduction

The Commission has amended its environmental protection regulations in 10 CFR Part 51 to improve the efficiency of the process of environmental review for applicants seeking to renew an operating license for up to an additional 20 years. The amendments are based on the analyses conducted for

and reported in NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (xxxx 1996). The Commission's initial decision to undertake a generic assessment of the environmental impacts associated with the renewal of a nuclear power plant operating license was motivated by its beliefs that:

(1) License renewal will involve nuclear power plants for which the environmental impacts of operation are well understood as a result of data evaluated from operating experience to date;

(2) Activities associated with license renewal are expected to be within this range of operating experience, thus environmental impacts can be reasonably predicted; and

(3) Changes in the environment around nuclear power plants are gradual and predictable with respect to characteristics important to environmental impact analyses.

Although this amendment is consistent with the generic approach and scope of the proposed amendment published on September 17, 1991 (56 FR 47016), several significant modifications have been made in response to the public comments received. The proposed amendment would have codified the findings reached in the draft generic environmental impact statement (GEIS) as well as certain procedural requirements. The draft GEIS established the bounds and significance of potential environmental impacts at 118 light-water nuclear power reactors that, as of 1991, were licensed to operate or were expected to be licensed in the future.

All potential environmental impacts and other matters treated by the NRC in an environmental review of nuclear power plants were identified and combined into 104 discrete issues. For each issue, the NRC staff established generic findings encompassing as many nuclear power plants as possible. These findings would have been codified by the proposed amendment. Of the 104 issues reviewed for the proposed rule, the staff determined that 80 issues could be adequately addressed generically and would not have been reviewed in plant-specific license renewal reviews. For 22 of the issues, it was found that the issue was adequately addressed for some but not all plants. Therefore, a plant-specific review would be required to determine whether the plant is covered by the generic review or whether the issue must be assessed for that plant. The proposed amendment provided guidance on the application of these findings at the site-specific license renewal stage. For the two remaining issues, it was found that the issue was not generically addressed for any plant, and thus a plant-specific review would have been required for all plants.

Other major features of the proposed amendment included a conditional finding of a favorable cost-benefit balance for license renewal and a provision for the use of an environmental assessment that would address only those issues requiring plant-specific review. A finding of no significant impact would have resulted in a favorable cost-benefit balance for that plant. If a finding of no significant impact could not be made for the plant, there would have to have been a determination as to whether the impacts found in the

environmental assessment were sufficient to overturn the conditional cost-benefit balance found in the rule.

Although the final amendments to 10 CFR Part 51 maintain the same generic approach used in the proposed rule, there are several modifications. The final amendments to 10 CFR Part 51 now contain 92 issues. The reduction of the number of issues from 104 in the proposed rule to 92 in the final rule is due to (1) the elimination from the review of the consideration of the need for electric power and associated generating capacity and of the direct economic benefits and costs associated with electric power, (2) removing alternatives as an issue from Table B-1 and addressing review requirements only in the text of the rule, (3) combining the five severe accident issues used in the proposed rule into one issue, (4) eliminating several regional economic issues under socioeconomics that are not directly related to environmental impacts, (5) making minor changes to the grouping of issues under aquatic ecology and groundwater, (6) identifing collective offsite radiological impacts associated with the fuel cycle and all impacts of high level waste and spent fuel disposal as seperate issues, and (7) adding environmental justice as an issue for consideration.

Of the 92 issues in the final rule, 68 issues were found to be adequately addressed in the GEIS, and therefore, additional assessment will not be required in a plant-specific review. Twenty-four issues were found to require additional assessment for at least some plants at the time of the license renewal review. In the final rule, the 2 issues in the proposed rule

that would have required review for all plants are now included in the set of 24 issues of the final rule.

Public comments on the adequacy of the analysis for each issue were considered by the NRC staff. Any changes to the analyses and findings that were determined to be warranted were made in the final GEIS and incorporated in the rule. Several changes were made to the procedural features of the proposed rule in response to comments by the Council on Environmental Quality, the Environmental Protection Agency, and a number of State agencies. First, the NRC will prepare a supplemental site-specific environmental impact statement (SEIS), rather than an environmental assessment (as initially proposed), for each license renewal application. The SEIS will be issued for public comment as part of the individual plant review process. The NRC will delay any conclusions regarding the acceptability of the overall impacts of the license renewal until completion of the site-specific review. In addition, the SEIS will be prepared in accordance with existing public scoping requirements. The NRC will also review and consider any new and significant information presented during the review of individual license renewal applications. In addition, any person may challenge the validity of the conclusions codified in the rule by filing a petition for rulemaking pursuant to 10 CFR 2.802. Finally, the NRC will review the rule and the GEIS on a schedule that allows revisions, if required, every 10 years. This review will be initiated approximately 7 years after the completion of the previous revision cycle.

In addition to the changes involving public participation, this final rule also contains several changes regarding the scope of analysis and conclusions in the rule and GEIS. The conditional cost-benefit balance has been removed from the GEIS and the rule. In place of the cost-benefit balancing, the NRC will use a new standard that will require a determination of whether or not the adverse environmental impacts of license renewal are so great, compared with the set of alternatives, that preserving the option of license renewal for future decisionmakers would be unreasonable. The final amendment also eliminates NRC's consideration of the need for generating capacity and the preparation of power demand forecasts for license renewal applications. The NRC acknowledges the primacy of State regulators and utility officials in defining energy requirements and determining the energy mix within their jurisdictions. Therefore, the issue of need for power and generating capacity will no longer be considered in NRC's license renewal decisions. The final GEIS has been revised to include an explicit statement of purpose and need for license renewal consistent with this acknowledgment. Lastly, the final rule has eliminated the consideration of utility economics from license renewal reviews under the National Environmental Policy Act (NEPA) except when such benefits and costs are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation. These and other features of the final rule are explained in detail below.

II. Rulemaking History

In 1986, the NRC initiated a program to develop license renewal regulations and associated regulatory guidance in anticipation of applications for the renewal of nuclear power plant operating licenses. A solicitation for comments on the development of a policy statement was published in the Federal Register on November 6, 1986 (51 FR 40334). However, the Commission decided to forgo the development of a policy statement and to proceed directly to rulemaking. An advance notice of proposed rulemaking was published on August 29, 1988 (53 FR 32919). Subsequently, the NRC determined that, in addition to the development of license renewal regulations focused on the protection of health and safety, an amendment to its environmental protection regulations in 10 CFR Part 51 was warranted.

On October 13, 1989 (54 FR 41980), the NRC published a notice of its intent to hold a public workshop on license renewal on November 13 and 14, 1989. One of the workshop sessions was devoted to the environmental issues associated with license renewal and the possible merit of amending 10 CFR Part 51. The workshop is summarized in NUREG/CP-0108, "Proceedings of the Public Workshop on Nuclear Power Plant License Renewal" (April 1990). Responses to the public comments submitted after the workshop are summarized in NUREG-1411, "Response to Public Comments Resulting from the Public Workshop on Nuclear Power Plant License Renewal" (July 1990).

On July 23, 1990, the NRC published an advance notice of proposed rulemaking (55 FR 29964) and a notice of intent to prepare a generic environmental impact statement (55 FR 29967). The proposed rule was published on September 17, 1991 (56 FR 47016). The same Federal Register notice described the supporting documents that were available and announced a public workshop to be held on November 4-5, 1991. The supporting documents for the proposed rule included:

(1) NUREG-1437, "Draft Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (August 1991);

(2) NUREG-1440, "Regulatory Analysis of Proposed Amendments to Regulations Concerning the Environmental Review for Renewal of Nuclear Power Plant Operating Licenses: Draft Report for Comment" (August 1991);

(3) Draft Regulatory Guide DG-4002, Proposed Supplement 1 to Regulatory Guide 4.2, "Guidance for the Preparation of Supplemental Environmental Reports in Support of an Application To Renew a Nuclear Power Station Operating License" (August 1991); and

(4) NUREG-1429, "Environmental Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants: Draft Report for Comment" (August 1991).

After the comment period, the NRC exchanged letters with the Council on Environmental Quality (CEQ) and the Environmental Protection Agency (EPA) to address their concerns about procedural aspects of the proposed rule. The Commission also decided that the staff should discuss with the States the

concerns raised in comments by a number of States that certain features of the proposed rule conflicted with State regulatory authority over the need for power and utility economics. To facilitate these discussions, the NRC staff developed an options paper entitled "Addressing the Concerns of States and Others Regarding the Role of Need for Generating Capacity, Alternative Energy Sources, Utility Costs, and Cost-Benefit Analysis in NRC Environmental Reviews for Relicensing Nuclear Power Plants: An NRC Staff Discussion Paper." A Federal Register notice published on January 18, 1994 (59 FR 2542) announced the scheduling of three regional workshops during February 1994 and the availability of the options paper. A fourth public meeting on the State concerns was held in May 1994 in order for the NRC staff to better understand written proposals that had been submitted by two industry organizations after the regional workshops. After considering the comments from the workshops and the written comments, the NRC staff issued a proposed supplement to the proposed rule published on July 25, 1994 (59 FR 37724), that it believed would resolve the States' concerns regarding the Commission's consideration of need for power and utility economics. Comments were requested on this proposal. The discussion below contains an analysis of these comments and other comments submitted in response to the proposed rule.

III. Analysis of Public Comments

The analysis of public comments and the NRC's responses to these comments are documented in NUREG-1529, "Public Comments on the Proposed 10 CFR Part 51 Rule for Renewal of Nuclear Power Plant Operating Licenses and Supporting Documents: Review of Concerns and NRC Staff Response" (xxxx 1996). The extent of comments received during the various stages of the rulemaking process and the principal concerns raised by the commenters, along with the corresponding NRC responses to these concerns, are discussed below.

A. Commenters

In response to the Federal Register notice on the proposed rule published on September 17, 1991 (56 FR 47016), 68 organizations and 49 private citizens submitted written comments. The 68 organizations included 5 Federal agencies; 26 State, regional, and local agencies; 19 nuclear industry organizations and engineering firms; 3 law firms; and 15 public interest groups. Before the close of the initial comment period, the NRC conducted a 2-day workshop on November 4-5, 1991, in Arlington, Virginia, to discuss the proposed rule. Representatives from Federal agencies, State agencies, utilities, engineering firms, law firms, and public interest groups attended the workshop. Workshop panelists included the NRC staff as well as representatives from the Department of Energy (DOE), Department of Interior

(DOI), Environmental Protection Agency (EPA), Council on Environmental Quality (CEQ), several State agencies, the nuclear industry, and public interest groups.

In February 1994, the NRC conducted three public meetings to solicit views on the NRC staff's options for addressing the need for generating capacity, alternative energy sources, economic costs, and cost-benefit analysis in the proposed rule. The intent to hold public meetings and the availability of the options paper was noticed in the Federal Register on January 12, 1994 (59 FR 2542). Written comments were also solicited on the options paper. The public meetings were held in Rockville, Maryland; Rosemont, Illinois; and Chicopee, Massachusetts. Representatives from several States, the National Association of Regulatory Utility Commissioners (NARUC), the nuclear industry, and public interest groups actively participated. Nineteen separate written comments were also submitted, primarily by the States and the nuclear industry. In their submittals, the Nuclear Energy Institute (NEI), formerly known as the Nuclear Management and Resources Council (NUMARC), and Yankee Atomic Electric Company (YAEC) each proposed an approach to handling the issues of need for generating capacity and alternative energy sources in the rule. For the NRC staff to better understand these proposals, an additional public meeting was held with NEI and YAEC on May 16, 1994, in Rockville, Maryland.

After considering the public comments on the NRC staff's options paper, the NRC issued a proposed supplement to the proposed rule; it was published in

the Federal Register on July 25, 1994 (59 FR 37724). The proposed supplement set forth the NRC staff's approach to the treatment of need for generating capacity and alternative energy sources, as well as the staff's revision to the purpose of and need for the proposed action (i.e., license renewal), which was intended to satisfy the States' concerns and to meet NEPA requirements. Twenty separate written comments were received in response to this solicitation from Federal and State agencies, the nuclear industry, a public interest group, and two private citizens.

B. Procedural Concerns

The commenters on the proposed rule raised significant concerns regarding the following procedural aspects of the rule:

(1) State and public participation in the license renewal process and the periodic assessment of the GEIS findings;

(2) The use of economic costs and cost-benefit balancing; and

(3) Consideration of the need for generating capacity and alternative energy sources in the environmental review of license renewal applications.

Each of these concerns and the NRC response is discussed below.

1. Public Participation and the Periodic Assessment of the Rule and the GEIS

Concern. Many commenters criticized the draft GEIS finding that 80 of 104 environmental issues could be generically applied to all plants and, therefore, would not be subject to plant-specific review at the time of license renewal. As a consequence, these commenters believe they are being denied the opportunity to participate in the license renewal process. Moreover, they pointed out that the site-specific nature of many important environmental issues does not justify a generic finding, particularly when the finding would have been made 20 years in advance of the decision to renew an operating license. The commenters believe that only a site-specific EIS to support a license renewal decision would satisfy NEPA requirements.

Federal and State agencies questioned how new scientific information could be folded into the GEIS findings because the GEIS would have been performed so far in advance of the actual renewal of an operating license. There were differing views on exactly how the NRC should address this question. A group of commenters, including CEQ and EPA, noted that the rigidity of the proposed rule hampers the NRC's ability to respond to new information or to different environmental issues not listed in the proposed rule. They believe that incorporation of new information can only be achieved through the process of amending the rules. One commenter recommended that, if the NRC decides to pursue the approach of making generic findings based on the

GEIS, the frequency of review and update should be specifically stated in the rule. Recommendations on the frequency of the review ranged from 2 years to 5 years.

Response. In SECY-93-032, February 9, 1993, the NRC staff reported to the Commission their discussions with CEQ and EPA regarding the concerns these agencies raised, which were also raised by other commenters, about limiting public comment and the consideration of significant new information in individual license renewal environmental reviews. The focus of the commenters concerns is the limited nature of the site-specific reviews contemplated under the proposed rule. In response, the NRC has reviewed the generic conclusions in the draft rule, expanded the opportunity for site-specific review, and confirmed that what remains as generic is so. Also, the framework for consideration of significant new information has been revised and expanded.

The major changes adopted as a result of these discussions are as follows:

1. The NRC will prepare a supplemental site-specific EIS, rather than an environmental assessment (as initially proposed), for each license renewal application. This SEIS will be a supplement to the GEIS. Additionally, the NRC will review comments on the draft SEIS and determine whether such comments introduce new and significant information not considered in the GEIS analysis. All comments on the applicability of the analyses of impacts codified in the rule and the analysis contained in the draft supplemental EIS will be addressed by NRC in the final supplemental EIS in accordance with

40 CFR 1503.4, regardless of whether the comment is directed to impacts in Category 1 or 2. Such comments will be addressed in the following manner:

a. NRC's response to a comment regarding the applicability of the analysis of an impact codified in the rule to the plant in question may be a statement and explanation of its view that the analysis is adequate including, if applicable, consideration of the significance of new information. A commenter dissatisfied with such a response may file a petition for rulemaking under 10 CFR 2.802. If the commenter is successful in persuading the Commission that the new information does indicate that the analysis of an impact codified in the rule is incorrect in significant respects (either in general or with respect to the particular plant), a rulemaking proceeding will be initiated.

b. If a commenter provides new information which is relevant to the plant and is also relevant to other plants (i.e., generic information) and that information demonstrates that the analysis of an impact codified in the final rule is incorrect, the NRC staff will seek Commission approval to either suspend the application of the rule on a generic basis with respect to the analysis or delay granting the renewal application (and possibly other renewal applications) until the analysis in the GEIS is updated and the rule amended. If the rule is suspended for the analysis, each supplemental EIS would reflect the corrected analysis until such time as the rule is amended.

c. If a commenter provides new, site-specific information which demonstrates that the analysis of an impact codified in the rule is incorrect

with respect to the particular plant, the NRC staff will seek Commission approval to waive the application of the rule with respect to that analysis in that specific renewal proceeding. The supplemental EIS would reflect the corrected analysis as appropriate.

2. The final rule and the GEIS will not include conditional cost-benefit conclusions or conclusions about alternatives. Conclusions relative to the overall environmental impacts including cumulative impacts will be left entirely to each site-specific SEIS.

3. After consideration of the changes from the proposed rule to the final rule and further review of the environmental issues, the NRC has concluded that it is adequate to formally review the rule and the GEIS on a schedule that allows revisions, if required, every 10 years. The NRC believes that 10 years is a suitable period considering the extent of the review and the limited environmental impacts observed thus far, and given that the changes in the environment around nuclear power plants are gradual and predictable with respect to characteristics important to environmental impact analyses. This review will be initiated approximately 7 years after completion of the last cycle. The NRC will conduct this review to determine what, if anything, in the rule requires revision.

Concern. As part of their comments on the July 1994 Federal Register notice, NEI, several utilities, and the DOE asked that the NRC reconsider its understanding with CEQ and EPA regarding the preparation of a site-specific

supplemental EIS for each license renewal action. These commenters supported an approach that would allow the preparation of an environmental assessment for reviewing the environmental impacts of license renewal.

Response. The NRC does not agree with this position. The NRC believes that it is reasonable to expect that an assessment of the full set of environmental impacts associated with an additional 20 years of operation of any plant would not result in a "finding of no significant impact." Therefore, the review for any plant would involve an environmental impact statement.

2. Economic Costs and Cost-Benefit Balancing

Concern. State, Federal, and utility representatives expressed concern about the use of economic costs and cost-benefit balancing in the proposed rule and the draft GEIS. Commenters criticized the NRC's heavy emphasis on economic analysis and the use of economic decision criteria. They argued that the regulatory authority over utility economics falls within the States' jurisdiction and to some extent within the jurisdiction of the Federal Energy Regulatory Commission. Commenters also believe that the cost-benefit balancing used in the proposed rule and the draft GEIS went beyond NEPA requirements and CEQ regulations (40 CFR Parts 1500 to 1508). They noted that CEQ regulations interpret NEPA to require only an assessment of the cumulative effects of a proposed Federal action on the natural and man-made environment.

Response. In response to these concerns, the NRC has eliminated the use of cost-benefit analysis and consideration of utility economics in its NEPA review of a license renewal application except when such benefits and costs are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation. As discussed in more detail in the following section, the NRC recognizes that the determination of the economic viability of continuing the operation of a nuclear power plant is an issue that should be left to appropriate State regulatory and utility officials.

3. Need for Generating Capacity and Alternative Energy Sources

Concern. In their comments on the proposed rule and the draft GEIS, several States expressed concern that the NRC's analysis of need for generating capacity would preempt or prejudice State energy planning decisions. They argued that the determination of need for generating capacity has always been the States' responsibility. Recommendations on how to address this issue ranged from withdrawing the proposed rule to changing the categorization of the issue so that a site-specific review can be performed, thus allowing for meaningful State and public participation. Almost all the concerned States called on the NRC to modify the rule to state explicitly that NRC's analysis does not preempt a State's jurisdiction over the determination of need for generating capacity.

Regarding the issue of alternative energy sources, several commenters contended that the site-specific nature of the alternatives to license renewal did not justify the generic finding in the GEIS. One significant concern about this finding is the States' perception that a generic finding, in effect, preempts the States' responsibility to decide on the appropriate mix of energy alternatives in their respective jurisdictions.

Three regional public meeting were held during the February 1994 to discuss the concerns of the States. At these meeting, and later in written comments, the State of New York proposed an approach to resolve the problem. The approach was endorsed by several other States. This approach had three major conditions:

(1) A statement in the rule that the NRC's findings on need and alternatives are only intended to satisfy the NEPA requirements and do not preclude the States from making their own determination with respect to these issues;

(2) The designation of the need for generating capacity and alternative energy sources as Category 3 (i.e., requiring site-specific evaluation); and

(3) A requirement that all site-specific EISs and relicensing decisions reference State determinations of need for generating capacity and alternative energy sources, and that they defer to those State determinations to the maximum extent possible.

Response. After consideration, the NRC staff did not accept all elements of the States' approach because the approach would have continued to require the NRC to consider the need for generating capacity and utility economics as part of its environmental analysis. In addition, the approach would have required the NRC to develop guidelines for determining the acceptability of State economic analyses, which some States may have viewed as an intrusion on their planning process.

The NRC staff developed and recommended another approach, which was published on July 25, 1994 (59 FR 37724), after consideration of information gathered at the regional meetings and from the written comments. This approach, which borrows some elements from NEI and YAEC proposals, has five major features:

(1) Neither the rule nor the GEIS would contain a consideration of the need for generating capacity or other issues involving the economic costs and benefits of license renewal and of the associated alternatives;

(2) The purpose and need for the proposed action (i.e., license renewal) would be defined as preserving the continued operation of a nuclear power plant as a safe option that State regulators and utility officials may consider in their future planning actions;

(3) The only alternative to the proposed action would be the "no-action" alternative, and the environmental consequences of this alternative are the impacts of a range of energy sources that might be used if a nuclear power plant operating license were not renewed;

(4) The environmental review for license renewal would include a comparison of the environmental impacts of license renewal with impacts of the range of energy sources that may be chosen in the case of "no action"; and

(5) The NRC's NEPA decision standard for license renewal would require the NRC to determine whether the environmental impacts of license renewal are so great that preserving the option of license renewal for future decisionmakers would be unreasonable.

The statement that the use of economic costs will be eliminated in this approach refers to the ultimate NEPA decision regarding the comparison of alternatives and the proposed action. This approach does not preclude a consideration of economic costs if these costs are essential to a determination regarding the inclusion of an alternative in the range of alternatives considered (i.e., an alternative's exorbitant cost could render it nonviable and unworthy of further consideration) or relevant to mitigation of environmental impacts. Also, the two local tax issues and the two economic structure issues under socioeconomics in the table would be removed from consideration when applying the decision standard.

Concern. Comments received from several States on the NRC staff's July 1994 recommended approach ranged from rejection to endorsement. Some States supported the three conditions proposed by the State of New York. Several States were still concerned about whether a meaningful analysis of need for generating capacity and alternative energy sources could be undertaken

20 years ahead of time. One State asked that the proposed rule be withdrawn. Another State wanted the proposed rule to be reissued for public comment. CEQ supported the approach proposed by the State of New York. CEQ believed that the NRC's recommended approach was in conflict with the NEPA process because the proposed statement of purpose and need for the proposed action was too narrow and did not provide for an appropriate range of alternatives to the underlying need for the proposed action. CEQ wanted the NRC to address other energy sources as separate alternatives, rather than as consequences of the no-action alternative. Moreover, CEQ stated that the proposed decision standard places a "weighty and improper burden of proof" on consideration of the alternative. The EPA endorsed CEQ's comments. In general, the nuclear industry was supportive of the recommended approach. However, NEI and the utilities strongly expressed the opinion that, with the redefined statement of purpose and need, alternative energy sources would no longer be alternatives to the proposed action and, therefore, need not be considered.

Response. After consideration of the comments received on the Commission's July 1994 proposal, the Commission has modified and clarified its approach in order to address the concerns of CEQ relative to consideration of appropriate alternatives and the narrow definition of purpose and need. These modifications and clarifications addressed the States' concerns relative to treatment of need for generating capacity and alternatives. Specifically, the Commission has clarified the purpose and need for license renewal in the GEIS as follows:

> The purpose and need for the proposed action (renewal of an operating license) is to provide an option that allows for power generation capability beyond the term of a current nuclear power plant operating license to meet future system generating needs, as such needs may be determined by State, utility, and, where authorized, Federal (other than NRC) decisionmakers.

Using this definition of the purpose of and need for the proposed action, which stresses options for the generation of power, the environmental review will include a characterization of alternative energy sources as being the alternatives to license renewal and not merely the consequences of the no-action alternative and, thus, it addresses CEQ's concern that the scope of the alternatives analysis is unacceptably restricted.

With respect to the States' concerns regarding need for generating capacity analysis, the NRC will neither perform analyses of the need for power nor draw any conclusions about the need for generating capacity in a license renewal review. This definition of purpose and need reflects the Commission's recognition that, absent findings in the safety review required by the Atomic Energy Act of 1954, as amended, or in the NEPA environmental analysis that would lead the NRC to reject a license renewal application, the NRC has no role in the energy planning decisions of State regulators and utility officials. From the perspective of the licensee and the State regulatory authority, the purpose of renewing an operating license is to maintain the availability of the nuclear plant to meet system energy requirements beyond the term of the plant's current license. The underlying need that will be met

by the continued availability of the nuclear plant is defined by various operational and investment objectives of the licensee. Each of these objectives may be dictated by State regulatory requirements or strongly influenced by State energy policy and programs. In cases of interstate generation or other special circumstances, Federal agencies such as the Federal Energy Regulatory Commission (FERC) or the Tennessee Valley Authority (TVA) may be involved in making these decisions. The objectives of the various entities involved may include lower energy cost, increased efficiency of energy production and use, reliability in the generation and distribution of electric power, improved fuel diversity within the State, and environmental objectives such as improved air quality and minimized land use.

The consideration of alternatives has been shifted to the site-specific review. The rule contains no information or conclusions regarding the environmental impacts of alternative energy sources, it only indicates that the environmental impact of alternatives will be considered during the individual plant review. However, the GEIS contains a discussion of the environmental impacts of alternative energy sources based on currently available information. The information in the GEIS is available for use by the NRC and the licensee in performing the site-specific analysis of alternatives and will be updated as appropriate. For individual plant reviews, information codified in the rule, information developed in the GEIS, and any significant new information introduced during the plant-specific review, including any information received from the State, will be considered

in reaching conclusions in the supplemental EIS. The NRC's site-specific comparison of the impacts of license renewal with impacts of alternative energy sources will involve consideration of information provided by State agencies and other members of the public. This approach should satisfy the States' concerns relative to a meaningful analysis of alternative energy sources.

The Commission disagrees with CEQ's assertion that the new decision standard is inappropriate. Under this decision standard, the NRC must determine if the adverse environmental impacts of license renewal are so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable. The Commission expects that license renewal would be denied only if the expected environmental effects of license renewal significantly exceed all or almost all alternatives. The Commission believes that this is a reasonable approach to addressing the issue of environmental impacts of license renewal, given NRC's limited role in the area of energy systems planning. The operation of a nuclear power plant beyond its initial license term involves separate regulatory actions, one taken by the utility and the NRC, and the other taken by the utility and the State regulatory authorities. The decision standard would be used by NRC to determine whether, from an environmental perspective, it is reasonable to renew the operating license and allow State and utility decisionmakers the option of considering a currently operating nuclear power plant as an alternative for meeting future energy needs. The test of reasonableness

focuses on an analysis of whether the environmental impacts anticipated for continued operation during the term of the renewed license reasonably compare with the impacts that are expected from the set of alternatives considered for meeting generating requirements. The NRC would reject a license renewal application if the analysis demonstrated that the adverse environmental impacts of the individual license renewal were so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable.

After the NRC makes its decision based on the safety and environmental considerations, the final decision on whether or not to continue operating the nuclear plant will be made by the utility, State, and Federal (non-NRC) decisionmakers. This final decision will be based on economics, energy reliability goals, and other objectives over which the other entities may have jurisdiction. The NRC has no authority or regulatory control over the ultimate selection of future energy alternatives. Likewise, the NRC has no regulatory power to ensure that environmentally superior energy alternatives are used in the future. Given the absence of the NRC's authority in the general area of energy planning, the NRC's rejection of a license renewal application based on the existence of a single superior alternative does not guarantee that such an alternative will be used. In fact, it is conceivable that the rejection of a license renewal application by the NRC in favor of an individual alternative may lead to the implementation of another alternative

that has even greater environmental impacts than the proposed action, license renewal.

Given the uncertainties involved and the lack of control that the NRC has in the choice of energy alternatives in the future, the Commission believes that it is reasonable to exercise its NEPA authority to reject license renewal applications only when it has determined that the impacts of license renewal sufficiently exceed the impacts of all or almost all of the alternatives that preserving the option of license renewal for future decision makers would be unreasonable. Because the objectives of the utility and State decisionmakers will ultimately be the determining factors in whether a nuclear power plant will continue to operate, NRC's proposed decision standard is appropriate. The decision standard will not affect the scope or rigor of NRC's analyses, including the consideration of the environmental impacts relevant to the license renewal decision and associated alternatives. The NRC staff believes that, under the circumstances, the decision standard does not place "a weighty and improper burden of proof" on other alternatives as CEQ claims.

With respect to the industry's desire to eliminate consideration of alternative energy sources, the Commission does not agree. The Commission does not support the views of NEI and others that alternative energy sources need not be considered in the environmental review for license renewal. The Commission is not prepared to state that no nuclear power plant will fall well outside the range of other reasonably available alternatives far in advance of

an actual relicensing decision. Following NEI's suggestion would not lead to a meaningful set of alternatives with which to compare a proposed action. The Commission has always held the view that alternative sources of energy should be compared with license renewal and continued operation of a nuclear power plant.

Lastly, the Commission does not believe it is necessary to reissue this rule for public comment as a State commenter requested. The Commission has taken many measures to involve the public concerning the resolution of public comments on the proposed rule. The Commission has conducted a number of public meetings and published for public comment its recommended procedural revisions to the proposed rule. The Commission believes that modifications made to the proposed rule reflect the logical outgrowth of the proposed rule based on the public comments received by the Commission.

C. Technical Concerns

1. Category and Impact Magnitude Definitions

Concerns. Many commenters expressed concern that the category definitions and the impact-significance definitions were ambiguous and appeared somewhat interconnected. The EPA expressed concern that mitigation of adverse impacts was not addressed adequately.

Commenters expressed a number of concerns about the use of the applicability categories and the magnitude-level categories. With respect to

the applicability categories, concerns ranged from a general concern that Category 1 precludes or hinders public involvement in an issue at the time of the plant-specific review to specific concerns about the technical adequacy of the analysis supporting a Category 1 finding for an issue. Several commenters believed that the definitions create confusion, especially as to whether the finding of small impact and Category 1 are interdependent. The GEIS appears to use Category 1 and "small" interchangeably. Concern was also expressed that the requirement to consider mitigative actions was inadequately addressed in the draft GEIS and proposed rule.

Response. To reduce potential confusion over the definitions, the use of the categories, and the treatment of mitigation within the context of the categorization scheme, the NRC has revised the definitions to eliminate any ambiguity as to how they are used. Further, the GEIS has been modified to clearly state the reasons behind the category and magnitude findings.

In order to facilitate understanding of the modifications to the GEIS, the previous approach is discussed as follows. In the proposed rule and the draft GEIS, findings about the environmental impact associated with each issue were divided into three categories of applicability to individual plant reviews. These categories were:

- Category 1: A generic conclusion on the impact has been reached for all affected nuclear power plants.

• Category 2: A generic conclusion on the impact has been reached for affected nuclear power plants that fall within defined bounds.

• Category 3: A generic conclusion on the impact was not reached for any affected nuclear power plants.

The significance of the magnitude of the impact for each issue was expressed as one of the three following levels.

• Small impacts are so minor that they warrant neither detailed investigation nor consideration of mitigative actions when such impacts are negative.

• Moderate impacts are likely to be clearly evident and usually warrant consideration of mitigation alternatives when such impacts are negative.

• Large impacts involve either a severe penalty or a major benefit, and mitigation alternatives are always considered when such impacts are negative.

With respect to the categories of applicability, under the proposed rule applicants would have:

(1) Not provided additional analyses of Category 1 issues;

(2) Not provided additional analyses if their plant falls within the bounds defined in the rule for a Category 2 issue;

(3) Provided additional plant-specific analyses if their plant does not fall within the bounds defined in the rule for a Category 2 issue; and

(4) Provided plant-specific analyses of Category 3 issues.

In order to address the comments on these magnitude and category definitions, the GEIS has been modified to clearly state the reasons behind the category and magnitude findings.

The revised definitions are listed below.

• Category 1: For the issue, the analysis reported in the Generic Environmental Impact Statement has shown:

(1) The environmental impacts associated with the issue have been determined to apply either to all plants or, for some issues, to plants having a specific type of cooling system or other specified plant or site characteristic;

(2) A single significance level (i.e., small, moderate, or large) has been assigned to the impacts (except for collective off site radiological impacts from the fuel cycle and from high level waste and spent fuel disposal); and

(3) Mitigation of adverse impacts associated with the issue has been considered in the analysis and it has been determined that additional plant-specific mitigation measures are likely not to be sufficiently beneficial to warrant implementation.

The generic analysis of the issue may be adopted in each plant-specific review. Issues for which the impact was found to be favorable were also defined to be Category 1 issues.

• Category 2: For the issue, the analysis reported in the GEIS has shown that one or more of the criteria of Category 1 cannot be met and, therefore, additional plant-specific review is required.

If, for an environmental issue, the three Category 1 criteria apply to all plants, that issue is Category 1 and the generic analysis should be used in a license renewal review for all plant applications. If the three Category 1 criteria apply to a subset of plants that are readily defined by a common plant characteristic, notably the type of cooling system, the population of plants is partitioned into the set of plants with the characteristic and the set without the characteristic. For the set of plants with the characteristic, the issue is Category 1 and the generic analysis should be used in the license renewal review for those plants. For the set of plants without the characteristic, the issue is Category 2 and a site-specific analysis for that issue will be performed as part of the license renewal review. The review of a Category 2 issue may focus on the particular aspect of the issue that causes the Category 1 criteria not to be met. For example, severe accident mitigation under the issue "severe accidents" is the focus for a plant-specific review because the other aspects of the issue, specifically

the offsite consequences, have been adequately addressed in the GEIS. With the revised definitions, the two issues previously designated as Category 3 are now designated Category 2. For an issue to be a Category 1, current mitigation practices and the nature of the impact were considered and a determination was made that it is unlikely that additional measures will be sufficiently beneficial. In the GEIS, in discussing the impacts for each issue, consideration was given to what is known about current mitigation practices.

The definitions of the significance level of an environmental impact have been revised to make the consideration of the potential for mitigating an impact separate from the analysis leading to a conclusion about the significance level of the impact. Further, the significance level of an impact is now more clearly tied to sustaining specific attributes of the affected resource that are important to its viability, health or usefulness. General definitions of small, moderate and large significance levels are given below. These definitions are adapted to accommodate the resource attributes of importance for each of the environmental issues in the GEIS. The definition of "small" clarifies the meaning of the term as it applies to radiological impacts. The definition of "small" in the proposed rule did not logically apply to such impacts.

The general definitions of significance level are:

• Small: For the issue, environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any

important attribute of the resource. For the purposes of assessing radiological impacts, the Commission has concluded that those impacts that do not exceed permissible levels in the Commission's regulations are considered small.

- Moderate: For the issue, environmental effects are sufficient to alter noticeably but not to destabilize important attributes of the resource.
- Large: For the issue, environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

The discussion of each environmental issue in the GEIS includes an explanation of how the significance category was determined. For issues in which probability of occurrence is a key consideration (i.e., accident consequences), the probability of occurrence has been factored into the determination of significance. The determination of the significance category was made independently of the consideration of the potential benefit of additional mitigation.

The major concerns (organized by topical areas) about the environmental issues examined in the draft GEIS and the NRC staff's response to those concerns are summarized next.

2. Surface Water Quality

Concern. Several commenters expressed concerns related to the National Pollutant Discharge Elimination System (NPDES) permitting process for surface water discharge. They believe that the NRC may have overlooked its legal obligation to comply with Section 401 of the Clean Water Act (CWA). Their recommendations included withholding approval for license renewal until a facility has complied with Section 401 and treating license renewal as an opportunity for a new NEPA review. On the other hand, other commenters recommended decoupling the NRC relicensing process from the NPDES permitting process.

Response. In issuing individual license renewals, the Commission will comply, as has been its practice, with the provisions of Section 401 of the Federal Water Pollution Control Act (see 10 CFR 51.45(d) and 51.71(c)). In addition, pursuant to Section 511(c) of the Federal Water Pollution Control Act of 1972, the Commission cannot question or reexamine the effluent limitations or other requirements in permits issued by the relevant permitting authorities. Nevertheless, compliance with the environmental quality standards and requirements of these permits does not negate the requirement for the Commission to consider all environmental effects of the proposed action. Accordingly, the Commission has not only taken existing permits into account in its analysis of the water quality impacts of license renewal but has also considered information on actual operating impacts collected from

individual plants, State and Federal regulatory agencies, and published literature. As a result of this analysis, the Commission has concluded that the environmental impacts on surface water quality are small for those effluents subject to existing permit or certification requirements. A total decoupling of the license renewal process and the NPDES permitting process is not appropriate because, for issues with incomplete Clean Water Act determinations, the NRC cannot complete its weighing and balancing of impacts without independently addressing the issues.

Concern. Several commenters raised concerns that various issues within the Surface Water Quality topic should be Category 2 or 3 issues. These included water use conflicts as experienced in Arizona and the Midwest, thermal stratification and salinity gradients associated with once-through cooling systems, and the toxicity of biofouling compounds.

Response. Regarding the water use conflicts, the NRC has considered the impacts of water use during the renewal period and has concluded that these impacts are small for plants with a once-through cooling system and that this is a Category 1 issue for those plants. However, this issue is designated Category 2 for plants with cooling towers and cooling ponds because, for those plants, the impacts might be moderate (they could also be small). In either case, pursuant to 10 CFR 51.45(d), an applicant for license renewal must identify and indicate in its environmental report the status of State and local approvals regarding water use issues. For those reactor sites where thermal stratification or salinity gradient was found to be the most

pronounced, the issues were reviewed during preparation of the GEIS and found to be acceptable by the States within the NPDES process. No change in the categorization in the GEIS would be required. Similarly, the NPDES permit for a facility establishes allowable discharges, including biocides. The NRC has no indication that residual environmental impacts would occur as a result of license renewal activities at any nuclear plant site other than perhaps water use conflicts arising at plants with cooling ponds or cooling towers using make-up water from a small river with low flow. For those plants, this issue is Category 2.

3. Aquatic Ecology

Concern. A number of comments regarding the ecological impact of cooling water withdrawal from aquatic bodies were received. Specific concerns included fish kills associated with the entrainment and impingement of fish within once-through and cooling pond cooling systems, the use of chlorine and molluscicides to control mussel and clam growth, and the long-term effects of heavy metal discharges from plants with copper-nickel condenser tubes. Another commenter noted that license extension affords the opportunity to review the intake and discharge configuration of plant cooling water systems, since the best available technology that is economically available may be different given the additional 20 years of plant operating life.

Response. The Commission has considered the impacts of license renewal on aquatic ecology and, in doing so, has reviewed existing NPDES permits and other information. Based on this analysis, the Commission has concluded that these impacts are small with the exception that plants with once-through cooling and cooling ponds may have larger effects associated with entrainment of fish and shellfish in early life stages, impingement, and heat shock. Agencies responsible for existing permits are not constrained from reexamining the permit issues if they have reason to believe that the basis for their issuance is no longer valid. The Commission does not have authority under NEPA to impose an effluent limitation other than those established in permits issued pursuant to the Clean Water Act. The problem of the long-term effects of heavy metal discharges from plants with copper-nickel condenser tubes has been found at only one plant. The affected condenser tubes have been replaced with tubing of a more corrosion-resistant material.

Concern. A commenter pointed out that the issue of riparian zones should be addressed in the GEIS because the vegetation region along a water course can be affected by water withdrawal and is important in maintaining the habitat.

Response. The NRC agrees with the importance of addressing the impacts of license renewal on the riparian habitat. The final GEIS provides a discussion of the riparian habitat as an important resource and the potential effects of consumptive water use on riparian zones.

4. Groundwater Use and Quality

Concern. Several commenters indicated that groundwater issues should be reviewed on a site-specific basis because of groundwater use conflicts (in particular, the effect on aquifer recharge of using surface water for cooling water), opportunities for saltwater intrusion, and concerns over tritium found in wells at one site. On the other hand, a commenter requested that the issue of groundwater use for cooling tower makeup water be changed from Category 2 to Category 1 because the issue is based solely on data from Ranney wells at the Grand Gulf Nuclear Station, where tests have shown that the elevation of the water plain around Grand Gulf is not dropping.

Response. Based on consideration of comments, the issue of groundwater use conflicts resulting from surface water withdrawals for cooling tower makeup water or cooling ponds is now Category 2 for plants withdrawing surface water from small water bodies during low flow conditions. The GEIS has identified a potential reduction in aquifer recharge as a result of competing water use. These conflicts are already a concern at two closed-cycle nuclear power plants. The NRC does not agree that saltwater intrusion should be considered a Category 2 issue. When saltwater intrusion has been a problem, the major cause has been the large consumption of groundwater by agricultural and municipal users. Groundwater consumption by nuclear power plants is small by comparison and does not contribute significantly to the saltwater intrusion problem. With regard to traces of tritium found in the groundwater at one

nuclear power plant, the tritium was attributed to a modification in the plant's inlet and discharge canal that did not take into consideration a unique situation in topology and groundwater flow. The releases were minor and the situation has been corrected.

Regarding the issue of the use of groundwater for cooling water makeup, the NRC has designated this issue as Category 2 even though only the Grand Gulf Nuclear Station is currently using Ranney wells to withdraw groundwater. This water intake does not conflict with other groundwater uses in the area. It is not possible to predict whether or not water use conflicts will occur at the Grand Gulf facility in the future. It is also not possible to determine the significance of the environmental impacts associated with Ranney well use at other nuclear plants that may choose to adopt this method in the future.

5. Terrestrial Ecology

Concern. Several commenters recommended that the issue of bird mortality resulting from collisions with transmission lines, towers, or cooling towers be characterized as a Category 2 issue. Such a characterization would provide for a review of mitigation at those plants with cooling towers that do not have illumination and for power plant transmission lines that transect major flyways or that cross wetlands used by large concentrations of birds.

Response. The NRC does not agree with this recommendation. The GEIS cites several studies that conclude that bird mortalities resulting from collision with transmission lines, towers, or cooling towers are not significantly reducing bird populations. Mitigation measures in place, such as safety lights, were found adequate and additional measures were not warranted. Therefore, the issue remains a Category 1 issue because refurbishment will not involve construction of any additional transmission lines or natural draft cooling towers.

Concern. One commenter expressed concern that the GEIS analysis of land use did not adequately encompass the impact of onsite spent fuel storage on land use and that the Category 1 finding is questionable. A specific concern was the potential need for the construction of additional spent fuel storage facilities associated with the license renewal term, along with their associated impacts on the terrestrial environment.

Response. The NRC does not agree that there is a need to change the Category 1 determination for onsite land use. Waste management operations could require the construction of additional storage facilities and thus adversely affect land use and terrestrial ecology. However, experience has shown that the land requirements would be relatively small (less than 9 acres), impacts to land use and terrestrial ecology would also be relatively small, and the land that may be used is already possessed by the applicant; thus, its basic use would not be altered. Onsite land use is Category 1.

Terrestrial ecology with disturbance of sensitive habitat is treated as a separate issue and is Category 2.

6. Human Health

Concern. In the human health section of the GEIS, the radiological impacts of plant refurbishment and continued operations during the license renewal term to workers and the general public were examined. Several commenters indicated that it was inappropriate to compare the radiation exposures associated with license renewal to natural background levels. These commenters believed that the appropriate argument should be that the risks associated with the additional exposures are so small that no additional mitigative measures are required.

Response. The NRC agrees that the assessment of radiation exposure should not be simply a comparison with background radiation. In response to comments on the draft generic environmental impact statement and the proposed rule, the standard defining a small radiological impact has changed from a comparison with background radiation to sustained compliance with the dose and release limits applicable to the various stages of the fuel cycle. This change is appropriate and strengthens the criterion used to define a small environmental impact for the reasons that follow. The Atomic Energy Act requires the Nuclear Regulatory Commission to promulgate, inspect and enforce standards that provide an adequate level of protection of the public health

and safety and the environment. The implimentation of these regulatory programs provides a margin of safety. A review of the regulatory requirements and the performance of facilities provides the bases to project continuation of performance within regulatory standards. For the purposes of assessing radiological impacts, the Commission has concluded that impacts are of small significance if doses to individuals and releases do not exceed the permissible levels in the Commission's regulations.

With respect to whether additional mitigative measures are required, it should be noted that in 10 CFR Parts 20 and 50 there are provisions that radiological impacts associated with plant operation be reduced to levels as low as reasonably achievable (ALARA).

Concern. Several commenters indicated that the GEIS needs a broader treatment of uncertainty as it relates to human health issues.

Response. The NRC agrees that there is considerable uncertainty associated with health effects, especially at low occupational and public dose levels, and particularly with respect to electromagnetic fields. Health effect estimates from radiation exposures are based on the best scientific evidence available and are considered to be conservative estimates. Several sections of the GEIS have been expanded to more thoroughly explain how predicted impacts could be affected by changes in scientific information or standards.

Concern. One commenter indicated that, in the GEIS and the proposed rule, risk coefficients should have been used for chemicals and radiation to obtain upper bound risk estimates of cancer incidence.

Response. The NRC does not agree with this comment. In making comparisons of alternatives, comparisons of the central or best estimates of impacts are consistent with NEPA requirements because they provide the fairest determination. The GEIS is written using current, Commission-approved risk estimators.

Concern. Two commenters expressed concern regarding the GEIS conclusion that the impact of radiation exposure to the public is small, citing a study done by the Massachusetts Department of Public Health (MDPH). This study concluded that adults who live within 10 miles of the Pilgrim Nuclear Power Plant have a risk of contracting leukemia four times greater than other individuals.

Response. The NRC staff reviewed the MDHP study and compared it with various other studies. The results of the study have been contradicted by a National Cancer Institute (NCI) study entitled "Cancer in Populations Living Near Nuclear Facilities" (July 1990). The NCI study, which included the Pilgrim plant in its analysis, found no reason to suggest that nuclear facilities may be linked causally with excess deaths from leukemia or from other cancers. The findings of the NCI study are consistent with the findings of several similar epidemiological studies in foreign countries and with the latest conclusions of expert bodies such as the National Research Council's

Committee on the Biological Effects of Ionizing Radiation. The NRC continues to bases its assessment of the health effects of ionizing radiation on the overall body of scientific knowledge and on the recommendations of expert groups.

7. Socioeconomics

Concern. A commenter concerned with historic preservation pointed out that this issue must be addressed through compliance with the National Historic Preservation Act (NHPA) and cannot be resolved generically.

Response. The NRC agrees with this comment. Historical and archaeological impacts have been changed from a Category 1 to a Category 2 issue (that is, it must be evaluated site-specifically). Consultation with State historical preservation offices and other Government agencies, as required by NHPA, must be undertaken to determine whether protected historical or archaeological resources are in areas that might be disturbed during refurbishment activities and operation during the renewal period.

Concern. Several commenters indicated that transportation issues associated with refurbishment activities should be changed from Category 3 to Category 2 because the impacts will be insignificant in the majority of cases. One recommendation was to use a level of service (LOS) determination for specific plants as the bounding criterion. The analysis would require that LOS be determined for that part of the refurbishment period during which

traffic not related to the plant is expected to be the heaviest. Another recommendation was to establish bounding criteria based on past major routine outages.

Response. The NRC agrees that use of the LOS approach may prove to be acceptable. Transportation still must be reviewed on a plant-specific basis, that is, it is a Category 2 issue (based on the revised definition).

Concern. There were recommendations to make the housing impacts during refurbishment a Category 1 issue instead of Category 2. One commenter noted that the construction period data used in the analysis appears to overestimate the impact on housing.

Response. The NRC does not agree that this should be a Category 1 issue. Although negligible housing impacts are anticipated for most license renewals, significant housing impacts have occurred during a periodic plant outage at one of the case plants studied for the analysis. This issue is now a Category 2 issue because moderate and large impacts on housing are possible depending on local conditions (e.g., areas with extremely slow population growth or areas with growth control measures that limit housing development).

8. The Uranium Fuel Cycle and Solid Waste Management

Concern. Wide-ranging concerns were expressed in the comments on the proposed rule and the draft GEIS about the treatment of storage and disposal of low-level waste (LLW), mixed waste, spent fuel, nonradiological waste, and the transportation of fuel and waste to and from nuclear power plants as a consequence of license renewal. Concern was expressed about the uncertain availability of disposal facilities for LLW, mixed waste, and spent fuel; the prospect of generation and onsite storage of an additional 20 years output of waste; and the resulting pressure that would be put on the States to provide LLW disposal facilities. Various commenters expressed concern about the adequacy of the treatment of the cost of waste management and the implications for the economic viability of license renewal. Numerous comments were provided on updating and clarifying data on waste management presented in the draft GEIS. Finally, various questions were raised about the applicability of Table S-3 (10 CFR 51.51 Uranium fuel cycle environmental data--Table S-3, Table of Uranium Fuel Cycle Environmental Data) to the management of waste generated as a result of license renewal.

With regard to spent fuel, several commenters expressed concern that dry cask storage is not a proven technology and that onsite storage of spent fuel from an additional 20 years of plant operation will present environmental and safety problems. Therefore, onsite storage of spent fuel should be considered on a site-specific basis within a plant license renewal review.

Response. The Commission acknowledges that there is uncertainty in the schedule of availability of disposal facilities for LLW, mixed waste, and

spent fuel. However, the Commission believes that there is sufficient understanding of and experience with the storage of LLW, mixed waste, and spent fuel to conclude that the waste generated at any plant as a result of license renewal can be stored safely and without significant environmental impacts before permanent disposal. In addition, the Commission concluded that the classification of storage and ultimate disposal as a Category 1 issue is appropriate because States are proceeding, albeit slowly, with the development of new disposal facilities; LLW and mixed waste have been and can be safely stored at reactor sites until new disposal capacity becomes available. Analyses to support this conclusion are presented in Chapter 6 of the final GEIS (NUREG-1437). The following summary of the responses to comments emphasizes the main features of these analyses.

In the draft GEIS, the environmental data in Table S-3 were discussed with respect to applicability during the license renewal period and supplemented with an analysis of the radiological release and dose commitment data for radon-222 and technetium-99. The proposed rule would have had this discussion apply to each plant at the time of its review for license renewal. Further, in the draft GEIS, Chapter 6, "Solid Waste Management," covered the generation of LLW, mixed waste, spent fuel, and nonradiological waste as a result of license renewal; the transportation of the radiological waste; and the environmental impacts of waste management, including storage and disposal. The findings that were to have been codified in the rule were that, for nonradiological waste, mixed waste, spent fuel, and transportation, the

environmental impacts are of small significance and that the analysis in the GEIS applies to each plant (Category 1). For LLW, the finding that would have been codified in the rule was that, if an applicant does not have access to a low-level radioactive waste disposal facility through a low-level waste compact or an unaffiliated State, the applicant must present plans for interim waste storage with an assessment of potential ecological habitat destruction caused by construction activities (Category 2).

In response to the questions about the applicability of Table S-3 to the management of waste associated with license renewal and to the various comments challenging the treatment of the several forms of waste in the draft GEIS and in the proposed rule, the discussion of Table S-3 has been moved from Section 4.8 of the draft GEIS to Chapter 6 of the final GEIS in order to provide a more integrated assessment of the environmental impacts associated with waste management as a consequence of license renewal. Also in response to various comments, the discussion of Table S-3 and of each of the types of waste has been expanded.

Supplemental data are presented in Chapter 6 of the final GEIS in order to extend the coverage of the environmental impacts of the uranium fuel cycle presented in the current Table S-3 and of transportation of radioactive waste presented in the current Table S-4 to radon-222, technetium-99, higher fuel enrichment, and higher fuel burnup. In part, the current Table S-3 and the data supplementing it cover environmental impacts of:

(1) Onsite storage of spent fuel assemblies in pools for 10 years, packaging and transportation to a Federal repository, and permanent disposal; and

(2) Short-term storage onsite of LLW, packaging and transportation to a land-burial facility, and permanent disposal.

The following conclusions have been drawn with regard to the environmental impacts associated with the uranium fuel cycle.

The radiological and nonradiological environmental impacts of the uranium fuel cycle have been reviewed. The review included a discussion of the values presented in Table S-3, an assessment of the release and impact of ^{222}Rn and of ^{99}Tc, and a review of the regulatory standards and experience of fuel cycle facilities. For the purpose of assessing the radiological impacts of license renewal the Commission uses the standard that the impacts are of small significance if doses and releases do not exceed permissible levels in the Commission's regulations. Given the available information regarding the compliance of fuel cycle facilities with applicable regulatory requirements, the Commission has concluded that, other than for the disposal of spent fuel and high-level waste, these impacts on individuals from radioactive gaseous and liquid releases will remain at or below the Commission's regulatory limits. Accordingly, the Commission concludes that offsite radiological impacts of the fuel cycle (individual effects from other than the disposal of spent fuel and high-level waste) are small. ALARA efforts will continue to apply to fuel cycle activities. This is a Category 1 issue.

The radiological impacts of the uranium fuel cycle on human populations over time (collective effects) have been considered within the framework of Table S-3. The 100 year environmental dose commitment to the U.S. population from the fuel cycle, high level waste and spent fuel disposal excepted, is calculated to be about 14,800 man-rem, or 12 cancer fatalities, for each additional 20 year power reactor operating term. Much of this, especially the contribution of radon releases from mines and tailing piles, consists of tiny doses summed over large populations. This same dose calculation can theoretically be extended to include many tiny doses over additional thousands of years as well as doses outside the U.S. The result of such a calculation would be thousands of cancer fatalities from the fuel cycle, but this result assumes that even tiny doses have some statistical adverse health effect which will not ever be mitigated (for example no cancer cure in the next thousand years), and that these dose projections over thousands of years are meaningful. However these assumptions are questionable. In particular, science cannot rule out the possibility that there will be no cancer fatalities from these tiny doses. For perspective, the doses are very small fractions of regulatory limits, and even smaller fractions of natural background exposure to the same populations. No standards exist that can be used to reach a conclusion as to the significance of the magnitude of the collective radiological effects. Nevertheless, some judgement as to the regulatory NEPA implication of this issue should be made and it makes no sense to repeat the same judgement in every case. The Commission concludes that

these impacts are acceptable in that these impacts would not be sufficiently large to require the NEPA conclusion, for any plant, that the option of extended operation under 10 CFR Part 54 should be eliminated. Accordingly, while the Commission has not assigned a single level of significance for the collective effects of the fuel cycle, this issue is considered Category 1. For other Category 1 issues, the impacts will be considered at the individual renewal stage as a means of judging the total impact of an individual license renewal decision. However, the Commission has already judged the impact of collective effects of the fuel cycle as part of this rule.

There are no current regulatory limits for off-site releases of radionuclides for the current candidate repository site. However if we assume that limits are developed along the lines of the 1995 National Academy of Sciences (NAS) report, and that in accordance with the Commission’s Waste Confidence Decision, a repository can and likely will be developed at some site which will comply with such limits, peak doses to virtually all individuals will be 100 millirem per year or less. However, while the Commission has reasonable confidence that these assumptions will prove correct there is considerable uncertainty since the limits are yet to be developed, no repository application has been completed or reviewed, and uncertainty is inherent in the models used to evaluate possible pathways to the human environment. The National Academy report indicated that 100 millirem per year should be considered as a starting point for limits for individual doses, but notes that some measure of consensus exists among national and international

bodies that the limits should be a fraction of the 100 millirem per year. The lifetime individual risk from 100 millirem per year dose limit is about $3x10^{-3}$. Doses to populations from disposal cannot now (or possibly ever) be estimated without very great uncertainty. Estimating cumulative doses to populations over thousands of years is more problematic. The likelihood and consequences of events that could seriously compromise the integrity of a deep geologic repository were evaluated by the Department of Energy in the "Final Environmental Impact Statement: Management of Commercially Generated Radioactive Waste," October 1980. The evaluation estimated the 70-year whole-body dose commitment to the maximum individual and to the regional population resulting from several modes of breaching a reference repository in the year of closure, after 1,000 years, after 100,000 years, and after 100,000,000 years. The release scenarios covered a wide range of consequences from the limited consequences of humans accidentially drilling into a waste package in the repository to the catastrophic release of the repository inventory by a direct meteor strike. Subsequently, the NRC and other federal agencies have expended considerable effort to develop models for the design and for the licensing of a high level waste repository, especially for the candidate repository at Yucca Mountain. More meaningful estimates of doses to population may be possible in the future as more is understood about the performance of the proposed Yucca Mountain repository. Such estimates would involve very great uncertainty, especially with respect to cumulative population doses over thousands of years. The standard proposed by the NAS is

a limit on maximum individual dose. The relationship of potential new regulatory requirements, based on the NAS report, and cumulative population impacts has not been determined, although the report articulates the view that protection of individuals will adequately protect the population for a repository at Yucca Mountain. However, EPA's generic repository standards in 40 CFR Part 191 generally provide an indication of the order of magnitude of cumulative risk to population that could result from the licensing of a Yucca Mountain repository, assuming the ultimate standards will be within the range of standards now under consideration. The standard in 40 CFR Part 191 protects the population by imposing "containment requirements" that limit the cumulative amount of radioactive material released over 10,000 years. The cumulative release limits are based on EPA's population impact goal of 1,000 premature cancer deaths world-wide for a 100,000 metric tonne (MTHM) repository.

Nevertheless, despite all the uncertainty surrounding the effects of the disposal of spent fuel and high-level waste, some judgement as to the regulatory NEPA implications of these matters should be made and it makes no sense to repeat the same judgement in every case. Even taking the uncertainties into account, the Commission concludes that these impacts are acceptable in that these impacts would not be sufficiently large to require the NEPA conclusion, for any plant, that the option of extended operation under 10 CFR Part 54 should be eliminated. Accordingly, while the Commission has not assigned a single level of significance for the impacts of spent fuel

and high-level waste disposal, this issue is considered Category 1. Excepting the collective effects previously discussed, for other Category 1 issues, the impacts will be considered at the individual renewal stage as a means of judging the total impact of an individual license renewal decision. However, the Commission has already judged the impacts of high level waste disposal as part of this rule.

With respect to the nonradiological impact of the uranium fuel cycle, data concerning land requirements, water requirements, the use of fossil fuel, gaseous effluent, liquid effluent, and tailings solutions and solids, all listed in Table S-3, have been reviewed to determine the significance of the environmental impacts of a power reactor operating an additional 20 years. The nonradiological impacts attributable to the relicensing of an individual power reactor are found to be of small significance. License renewal of an individual plant is so indirectly connected to the operation of fuel cycle facilities that it is meaningless to address the mitigation of impacts identified above. This is a Category 1 issue.

Table S-3 does not take into account long-term onsite storage of LLW, mixed waste, and storage of spent fuel assemblies onsite for longer than 10 years, nor does it take into account impacts from mixed waste disposal. The environmental impacts of these aspects of onsite storage are also addressed in Chapter 6 of the final GEIS and the findings are included in the final rule in Table B-1 of Appendix B to 10 CFR Part 51.

Chapter 6 of the GEIS discusses the impacts of offsite disposal of LLW and mixed waste and concludes that impacts will be small. The conclusion that impacts will be small is based on the regulations and regulatory programs in place (e.g., 10 CFR Part 61 for LLW and 40 CFR Parts 261, 264, and 268 for hazardous waste), experience with existing sites, and the expectation that NRC, EPA, and the States will ensure that disposal will occur in compliance with the applicable regulations.

The Low-Level Radioactive Waste Policy Act of 1980 (LLRWPA) made the States responsible for the disposal of commercially generated LLW. At present, 9 compacts have been formed, representing 42 States. The Texas Compact (Texas, Maine, and Vermont) is pending before the U.S. Congress.

New LLW disposal facilities in the host States of California, North Carolina, and Texas are forecast to be operational between 1997 and 1998. Facilities in the host States of Connecticut, Illinois, Massachusetts, Nebraska, New Jersey, Pennsylvania, and New York are scheduled for operation between 1999 and 2002. Envirocare, in Utah, takes limited types of waste from certain generators.

There are uncertainties in the licensing process and in the length of time needed to resolve technical issues, but in NRC's view there are no unsolvable technical issues that will inevitably preclude successful development of new sites or other off-site disposal capacity for LLW by the time they will be needed. For example, in California, the proposed Ward Valley LLW disposal facility was unexpectedly delayed by the need to resolve

technical issues raised by several scientists independent of the project after the license was issued. These issues were recently reviewed and largely resolved by an independent review group. In North Carolina, Texas, and Nebraska, the license application review period has been longer than is required by the LLRWPA, but progress continues to be made.

The State's LLW responsibilities include providing disposal capacity for mixed LLW. Mixed waste disposal facility developers face the same types of challenges as LLW site developers plus difficulties with dual regulation and small volumes. However, in NRC's view there are no technical reasons why offsite disposal capacity for all types of mixed waste should not become available when needed. NRC and EPA have developed guidance on the siting of mixed waste disposal facilities as well as a conceptual design for a mixed waste disposal facility. A disposal facility for certain types of mixed waste is operated by Envirocare in Utah. States have begun discussions with DOE about accepting commercial mixed waste for treatment and disposal at DOE facilities. Although these discussions have yet to result in DOE accepting commercial mixed waste at DOE facilities, it appears that progress is being made toward DOE's eventual acceptance of some portion of commercial mixed waste at its facilities.

While the NRC understands that there have been delays and that uncertainties exist such as those just discussed, the Commission concludes that there is reasonable assurance that sufficient LLW and mixed LLW disposal capacity will be made available when needed so that facilities can be

decommissioned consistent with NRC decommissioning requirements. This conclusion, coupled with the expected small impacts from both storage and disposal justify classification of LLW and mixed waste disposal as Category 1 issues.

The GEIS addresses the matter of extended onsite storage of both LLW and mixed waste from refurbishment and operations for a renewal period of up to 20 years. Summary data are provided and radiological and nonradiological environmental impacts are addressed. The analysis considers:

(1) The volumes of LLW and mixed waste that may be generated from license renewal;

(2) Specific requirements under the existing regulatory framework;

(3) The effectiveness of the regulations in maintaining low average doses to members of the public and to workers; and

(4) Nonradiological impacts, including land use, fugitive dust, air quality, erosion, sedimentation, and disturbance of ecosystems.

In addition, under 10 CFR 50.59, licensees are allowed to make changes to their facilities as discussed in the final safety analysis report without NRC permission if the evaluation indicates that a change in the technical specifications is not required or that an unreviewed safety question does not exist. Licensees would have to ensure that any new LLW activities would not represent an unreviewed safety question for routine operations or for conditions that might arise from potential accidents. Both onsite and offsite impacts would have to be considered. If a LLW or mixed waste activity fails

either of the two tests in 10 CFR 50.59, a license amendment is required. Subject to the two possible review requirements just noted, the Commission finds that continued onsite storage of both LLW and mixed waste resulting from license renewal will have small environmental impacts and will require no further review within the license renewal proceeding.

The GEIS addresses extended onsite storage of spent fuel during a renewal period of up to 20 years. The Commission has studied the safety and environmental effects of the temporary storage of spent fuel after cessation of reactor operation and has published a generic determination of no significant environmental impact (10 CFR 51.23). The environmental data on storing spent fuel onsite in a fuel pool for 10 years before shipping for offsite disposal have been assessed and reported in NUREG-0116, "The Environmental Survey of the Reprocessing and Waste Management Portions of the LWR Fuel Cycle" (October 1976), and published in the Commission's regulations (10 CFR 51.51). Environmental assessments (EA) for expanding the fuel pool storage capacity have been conducted for numerous plants. In each case, a finding of no significant environmental impact was reached.

Radioactive exposures, waste generation, and releases were evaluated and found to be small. The only nonradiological effluent from waste storage is additional heat from the plant that was found to have a negligible effect on the environment. Accidents were evaluated and were found to have insignificant effects on the environment. Dry cask storage at an independent spent fuel storage installation (ISFSI) is another technology used to store

spent fuel onsite. The Commission has recently amended its regulations in 10 CFR Part 72 to allow power reactor licensees to store spent fuel on site under a general license. The environmental impacts of allowing onsite dry cask storage under a general license were assessed in an EA and found to be insignificant. Further, the Commission has conducted EAs for seven specific licensed ISFSIs and has reached a finding of no significant environmental impact for each site. Each EA addressed the impacts of construction, use, and decommissioning. Potential impacts that were assessed include radiological impacts, land use, terrestrial resources, water use, aquatic resources, noise, air quality, socioeconomics, radiological impacts during construction and routine operation, and radiological impacts of off-normal events and accidents. Trends in onsite spent fuel storage capacity and the volume of spent fuel that will be generated during an additional 20 years of operation are considered in the GEIS. Spent fuel storage capacity requirements can be adequately met by ISFSIs without significant environmental impacts. The environmental impacts of onsite storage of spent fuel at all plants have been adequately assessed in the GEIS for the purposes of an environmental review and agency decision on renewal of an operating license; thus, no further review within the license renewal proceeding is required. This provision is relative to the license renewal decision and does not alter existing Commission licensing requirements specific to on-site storage of spent fuel.

The environmental impacts from the transportation of fuel and waste attributable to license renewal are found to be small when they are within the range of impacts of parameters identified in Table S-4. The estimated radiological effects are within regulatory standards. The nonradiological impacts are those from periodic shipments of fuel and waste by individual trucks or rail cars and thus would result in infrequent and localized minor contributions to traffic density. Programs designed to further reduce risk, which are already in place, provide for adequate mitigation. Recent, ongoing efforts by the Department of Energy to study the impacts of waste transportation in the context of the multi-purpose canister (see, 60 FR 45147, August 30, 1995) suggest that there may be unresolved issues regarding the magnitude of cumulative impacts from the use of a single rail line or truck route in the vicinity of the repository to carry all spent fuel from all plants. Accordingly, NRC declines to reach a Category 1 conclusion on this issue at this time. Table S-4 should continue to be the basis for case-by-case evaluation of transportation impacts of fuel and waste until such time as a detailed analysis of the environmental impacts of transportation to the proposed repository at Yucca Mountain becomes available.

9. Accidents

Concern. Several commenters expressed concerns regarding the appropriateness of the severe accident determination in the GEIS and with the

treatment of severe accident mitigation design alternatives (SAMDAs) for license renewal. A group of commenters identified areas of concern that they believe justify severe accidents being classified as a Category 3 issue. The areas included seismic risks to nuclear power plants and site-specific evacuation risks. Several commenters questioned whether the analyses of the environmental impacts of accidents were adequate to make a Category 1 determination for the issue of severe accidents. The contention is that a bounding analysis would be established only if plant-specific analyses were performed for every plant, which was not the case. Instead, the GEIS analysis made use of a single generic source term for each of the two plant types.

Response. The Commission believes that its analysis of the impacts of severe accidents is appropriate. The GEIS provides an analysis of the consequences of severe accidents for each site in the country. The analysis adopts standard assumptions about each site for parameters such as evacuation speeds and distances traveled, and uses site-specific estimates for parameters such as population distribution and meteorological conditions. These latter two factors were used to evaluate the exposure indices for these analyses. The methods used result in predictions of risk that are adequate to illustrate the general magnitude and types of risks that may occur from reactor accidents. Regarding site-evacuation risk, the radiological risk to persons as they evacuate is taken into account within the individual plant risk assessments that form the basis for the GEIS. In addition, 10 CFR Part 50 requires that licensees maintain up-to-date emergency plans. This requirement

will apply in the license renewal term as well as in the current licensing term.

As was done in the GEIS analysis, the use of generic source terms (one set for PWRs and another for BWRs) is consistent with the past practice that has been used and accepted by the NRC for individual plant Final Environmental Impact Statements (FEISs). The purpose of the source term discussion in the GEIS is to describe whether or not new information on source terms developed after the completion of the most recent FEISs indicates that the source terms used in the past under-predict environmental consequences. The NRC has concluded that analysis of the new source term information developed over the past 10 years indicates that the expected frequency and amounts of radioactive release under severe accident conditions are less than that predicted using the generic source terms. A summary of the evolution of this research is provided in NUREG-1150, "Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants" (December 1990), and its supporting documentation. Thus, the analyses performed for the GEIS represent adequate, plant-specific estimates of the impacts from severe accidents that would generally over-predict, rather than under-predict, environmental consequences. Therefore, the GEIS analysis of the impacts of severe accidents for license renewal is retained and is considered applicable to all plants.

Based on an evaluation of the comments, the Commission has reconsidered its previous conclusion in the draft GEIS concerning site-specific consideration of severe accident mitigation. The Commission has determined

that a site-specific consideration of alternatives to mitigate severe accidents will be required at the time of license renewal unless a previous consideration of such alternatives regarding plant operation has been included in a final environmental impact statement or a related supplement. Because the third criterion required to make a Category 1 designation for an issue requires a generic consideration of mitigation, the issue of severe accidents must be reclassified as a Category 2 issue that requires a consideration of severe accident mitigation alternatives, provided this consideration has not already been completed. The Commission's reconsideration of the issue of severe accident mitigation for license renewal is based on the Commission's NEPA regulations that require a consideration of mitigation alternatives in its environmental impact statements (EISs) and supplements to EISs, as well as a previous court decision that required a review of severe mitigation alternatives (referred to as SAMDAs) at the operating license stage. See, Limerick Ecology Action v. NRC, 869 F.2d 719 (3d Cir. 1989).

Although the Commission has considered containment improvements for all plants pursuant to its Containment Performance Improvement (CPI) program, which identified potential containment improvements for site-specific consideration by licensees, and the Commission has additional ongoing regulatory programs whereby licensees search for individual plant vulnerabilities to severe accidents and consider cost-beneficial improvements, these programs have not yet been completed. Therefore, a conclusion that

severe accident mitigation has been generically considered for license renewal is premature.

The Commission believes it unlikely that any site-specific consideration of severe accident mitigation alternatives for license renewal will identify major plant design changes or modifications that will prove to be cost-beneficial for reducing severe accident frequency or consequences. This Commission expectation regarding severe accident mitigation improvements is based on the analyses performed to date that are discussed below.

The Commission's CPI program examined each of the five U.S. containment types to determine potential failure modes, potential plant improvements, and the cost-effectivenesses of such improvements. As a result of this program, only a few containment improvements were found to be potentially beneficial and were either identified for further NRC research or for individual licensee evaluation.

In response to the Limerick decision, an NRC staff consideration of SAMDAs was specifically included in the Final Environmental Impact Statement for the Limerick 1 and 2 and Comanche Peak 1 and 2 operating license reviews, and in the Watts Bar Supplemental Final Environmental Statement for an operating license. The alternatives evaluated in these analyses included the items previously evaluated as part of the CPI Program, as well as improvements identified through other risk studies and analyses. No physical plant modifications were found to be cost-beneficial in any of these severe accident mitigation considerations. Only plant procedural changes were identified as

being cost-beneficial. Furthermore, the Limerick analysis was for a high-population site. Because risk is generally proportional to the population around a plant, this analysis suggests that other sites are unlikely to identify significant plant modifications that are cost-beneficial.

Additionally, each licensee is performing an individual plant examination (IPE) to look for plant vulnerabilities to internally initiated events and a seperate IPE for externally initiated events (IPEEE). The licensees were requested to report their results to the Commission. Seventy-eight IPE submittals were received and seventy-five IPEEE submittals will be received, covering all operating plants in the United States. These examinations consider potential improvements to reduce the frequency or consequences of severe accidents on a plant-specific basis and essentially constitute a broad search for severe accident mitigation alternatives. The NRC staff is conducting a process review of each plant-specific IPE submittal and IPEEE submittal. To date, all IPE submittals have received a preliminary review by the NRC with 46 out of 78 completed; for the IPEEE submittals, 24 of the 75 are under review. These IPEs have resulted in a number of plant procedural or programmatic improvements and some plant modifications that will further reduce the risk of severe accidents.

In conclusion, the GEIS analysis of severe accident consequences and risk is adequate, and additional plant-specific analysis of these impacts is not required. However, because the ongoing regulatory program related to severe accident mitigation (i.e., IPE and IPEEE) has not been completed for

all plants and consideration of severe accident mitigation alternatives has not been included in an EIS or supplemental EIS related to plant operations for all plants, a site-specific consideration of severe accident mitigation alternatives is required at license renewal for those plants for which this consideration has not been performed. The Commission expects that if these reviews identify any changes as being cost beneficial, such changes generally would be procedural and programmatic fixes, with any hardware changes being only minor in nature and few in number. NRC staff considerations of severe accident mitigation alternatives have already been completed and included in an EIS or supplemental EIS for Limerick, Comanche Peak, and Watts Bar. Therefore, severe accident mitigation alternatives need not be reconsidered for these plants for license renewal.

Based on the fact that a generic consideration of mitigation is not performed in the GEIS, a Category 1 designation for severe accidents cannot be made. Therefore, the Commission has reclassified severe accidents as a Category 2 issue, requiring only that alternatives to mitigate severe accidents be considered for those plants that have not included such a consideration in a previous EIS or supplemental EIS. The Commission notes that upon completion of its IPE/IPEEE program, it may review the issue of severe accident mitigation for license renewal and consider, by separate rulemaking, reclassifying severe accidents as a Category 1 issue.

The Commission does not intend to prescribe by rule the scope of an acceptable consideration of severe accident mitigation alternatives for

license renewal nor does it intend to mandate consideration of alternatives identical to those evaluated previously. In general, the Commission expects that significant efficiency can be gained by using site-specific IPE and IPEEE results in the consideration of severe accident mitigation alternatives. The IPEs and IPEEEs are essentially site-specific PRAs that identify probabilities of core damage (Level 1 PRA) and include assessments of containment performance under severe accident conditions that identify probabilities of fission product releases (Level 2). As discussed in Generic Letter 88-20, "Individual Plant Examination for Severe Accident Vulnerabilities" (November 23, 1988), one of the important goals of the IPE and IPEEE was to reduce the overall probabilities of core damage and fission product releases as necessary by modifying hardware and procedures to help prevent or mitigate severe accidents.

Although Level 3 PRAs have been used in SAMDA analyses to generate site-specific offsite dose estimates so that the cost-benefit of mitigation alternatives could be determined, the Commission does not believe that site-specific Level 3 PRAs are required to determine whether an alternative under consideration will provide sufficient benefit to justify its cost. Licensees can use other quantitative approaches for assigning site-specific risk significance to IPE results and judging whether a mitigation alternative provides a sufficient reduction in core damage frequency (CDF) or release frequency to warrant implementation. For example, a licensee could use information provided in the GEIS analysis (exposure indices, wind frequencies,

and demographics) to translate the dominant contributors to CDF and the large release frequencies from the IPE/IPEEE results into dose estimates so that a cost-benefit determination can be performed. In some instances, a consideration of the magnitude of reduction in the site-specific CDF and release frequencies alone (i.e., no conversion to a dose estimate) may be sufficient to conclude that no significant reduction in off-site risk will be provided and, therefore, implementation of a mitigation alternative is not warranted. The Commission will review each severe accident mitigation consideration provided by a license renewal applicant on its merits and determine whether it constitutes a reasonable consideration of severe accident mitigation alternatives.

10. Decommissioning

Concern. Several commenters requested further clarification of the NRC's position regarding decommissioning requirements, especially whether the total impacts address returning the site to green field conditions.

Response. The decommissioning chapter of the GEIS analyzes the impact that an additional 20 years of plant operation would have on ultimate plant decommissioning; it neither serves as the generic analysis of the environmental impacts associated with decommissioning nor establishes decommissioning requirements. An analysis of the expected impacts from plant decommissioning was previously provided in NUREG-0586, "Final Generic

Environmental Impact Statement on Decommissioning of Nuclear Facilities" (August 1988). The analysis in the GEIS for license renewal examines the physical requirements and attendant effects of decommissioning after a 20-year license renewal compared with decommissioning at the end of 40 years of operation and finds little difference in effects.

With respect to returning a site to green field condition, the Commission defines decommissioning as the safe removal of a nuclear facility from service, the reduction of residual contamination to a level that permits release of the property for unrestricted use, and termination of the license. Therefore, the question of restoring the land to a green field condition, which would require additional demolition and site restoration beyond addressing residual contamination and radiological effects, is outside the current scope of the decommissioning requirements. Moreover, consistent with the Commission's conclusion that license renewal is not expected to affect future decommissioning, any requirement relative to returning a site to a green field and the attendant effects of such a requirement would also not be affected by an additional 20 years of operation. Therefore, the issue of returning a site to pre-construction conditions is beyond the scope of license renewal review.

Concern. Several commenters expressed concern that, because a residual radioactivity rule is still not in place, the LLW estimates should be reexamined.

Response. The NRC does have criteria in place for the release of reactor facilities to unrestricted access following decommissioning. These include the guidance in Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors" (which provides guidance for surface contamination), dose rate limits from gamma-emitting radionuclides included in plant technical specifications, and requirements for keeping residual contamination as low as reasonably achievable (ALARA) as included in 10 CFR Part 20. These criteria were used in developing NUREG-0586, the final GEIS on decommissioning of nuclear facilities, which was published in August of 1988. One conclusion from the analysis conducted for NUREG-0586 was that waste volumes from decommissioning of reactors are not highly sensitive to the radiological criteria. A proposed rule dated August 22, 1994, would codify radiological criteria for unrestricted release of reactors and other nuclear facilities and for termination of a facility license following decommissioning. NUREG-1496, the draft GEIS for the proposed rule on radiological criteria, included analyses of a range of radiological release criteria and confirmed the earlier conclusions that waste volumes from decommissioning of reactors are not sensitive to the residual radiological criteria within the range likely to be selected. This range included residual dose levels comparable to the radiological criteria currently being used for reactor decommissioning. Based on the insensitivity of the waste volume from reactor decommissioning to the radiological criteria, the Commission continues to believe, as concluded in the decommissioning section of the GEIS, that the

contribution to environmental impacts of decommissioning from license renewal are small. The Commission further concludes that these impacts are not expected to change significantly as a result of the ongoing rulemaking. Therefore, the determinations in the GEIS remain appropriate.

11. Need for Generating Capacity

Concern. In addition to the major procedural concern discussed earlier about the treatment of need for generating capacity, several commenters raised concerns about the power demand projections used in the GEIS. Some commenters noted that any determination of need quickly becomes dated and, therefore, the demand for and the source of electrical power at the time of license renewal cannot be accurately predicted at this time. Moreover, they believe that the NRC's analysis is not definitive enough to remain unchallenged for 40 years. Another commenter criticized the analysis because it focused only on energy requirements without making appropriate distinctions between energy and peak capacity requirements, plant availability, and capacity factors.

Response. The NRC has determined that a detailed consideration of the need for generating capacity is inappropriate in the context of consideration of the environmental impacts of license renewal. Thus, the NRC will limit its NEPA review of license renewal applications to the consideration of the environmental impacts of license renewal compared with those of other available generating sources. Hence, the concerns regarding demand

projections used in the draft GEIS are no longer an issue and they have been removed from the GEIS.

12. Alternatives to License Renewal

Concern. In addition to the procedural concern discussed earlier about the treatment of alternative energy sources as a Category 1 issue, several commenters expressed concerns about the comparison and analysis of alternative energy sources, as well as the economic analysis approach used in the draft GEIS. Consistent with their arguments against the Category 1 designation of alternatives, the commenters questioned the approach adopted in the GEIS of comparing only single alternative energy sources to license renewal. They believe that the NRC's failure to consider a mix of alternatives ignores the potential for other alternative sources of power that are available to different regions of the nation, such as demand-side management, cogeneration, purchased power from Canada, biomass, natural gas, solar energy, and wind power. They also indicated that this approach neglects a utility's ability to serve its customers with a portfolio of supply that is based on load characteristics, cost, geography, and other considerations, and fails to consider the collective impact of the alternatives. Furthermore, the possible technological advances in renewable energy sources over the next 40 years are not addressed.

One commenter argued that designating the issue of alternative energy sources as Category 1 allows a license renewal applicant not to consider the additional requirement of economic threshold analysis. Relative to the economic analysis of the alternatives to license renewal, another commenter questioned the proposed requirement for the license renewal applicant to demonstrate that the "replacement of equivalent generating capacity by a coal-fired plant has no demonstrated cost advantage over the individual nuclear power plant license renewal." According to the commenter, this requirement would force the applicant to perform an economic analysis of an alternative to license renewal. The commenter further argued that NEPA does not require an economic consideration.

Response. In response to these concerns, the final rule no longer requires a cost comparison of alternative energy sources relative to license renewal. Furthermore, the alternative energy sources discussed in the final GEIS include energy conservation and energy imports as well as the other sources discussed by the commenters. An analysis of the environmental impacts of alternative energy sources is included in the GEIS but is not codified in 10 CFR Part 51.

The NRC believes that its consideration of alternatives in the GEIS is representative of the technologies available and the associated environmental impacts. With regard to consideration of a mix of alternative sources, the Commission recognizes that combinations of various alternatives may be used to replace power generation from license renewal.

13. License Renewal Scenario

Concern. Several commenters raised concerns related to the license renewal scenario evaluation methodology as implemented in the GEIS. The fundamental issues were the degree of conservatism built into the scenario and the appropriateness of an upper bound type approach in characterizing the refurbishment activities (and associated costs) in light of NEPA requirements to determine reasonable estimates of the environmental impacts of Federal actions.

Regarding the concerns that the refurbishment schedules and scenarios developed for the GEIS were too conservative, several commenters indicated that many of the activities slated for completion during the extended refurbishment before license renewal would actually be completed by many facilities during the course of the current licensing term. The effect of having only one major outage instead of leveling work over three or four outages could lead to an over-estimate of the refurbishment activities and costs that any particular plant would expect to see.

Response. In response to this concern, the NRC has revised the GEIS to include two license renewal program scenarios. The first scenario refers to a "typical" license renewal program and is intended to be representative of the type of programs that many plants seeking license renewal might implement. The second scenario retains the original objective of establishing an upper bound of the impacts likely to be generated at any particular plant. The

typical scenario is useful for estimating impacts at plants that have been well maintained and have already undertaken most major refurbishment activities necessary for operation beyond the current licensing term. The conservative scenario estimates continue to be useful for estimating the maximum impacts likely to result from license renewal.

The revised approach of providing two separate license renewal scenarios also alleviates the concern about the use of a bounding scenario for license renewal activities. The NRC acknowledges that some applicants for license renewal may not be required to perform certain major refurbishment or replacement activities and, therefore, may have fewer or shorter outages. However, the two scenarios described in the GEIS are neither unrealistic nor overconservative in representing the range of activities that could be expected for license renewal and the possible schedule for performing these activities.

14. Environmental Justice

On February 11, 1994, the President issued Executive Order (E.O.) 12898, "Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations" (59 FR 7629; February 16, 1994). This order requires each Federal agency to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies,

and activities on minority and low income populations. The Commission will endeavor to carry out the measures set forth in the executive order by integrating environmental justice into NRC's compliance with the National Environmental Policy of 1969 (NEPA), as amended. E.O. 12898 was issued after publication of the proposed rule and the receipt of comments on the proposed rule. As a result, no comments were received regarding environmental justice reviews for license renewal. Therefore, a brief discussion of this issue relative to license renewal is warranted.

As called for in Section 1-102 of E.O. 12898, the EPA established a Federal interagency working group to, among other things, "...provide guidance to Federal agencies or criteria for identifying disproportionately high and adverse human health or environmental effects on minority populations and low-income populations...." The CEQ was assigned to provide this guidance to enable agencies to better comply with E.O. 12898. Until the CEQ guidance is received, the Commission intends to consider environmental justice in its evaluations of individual license renewal applications. Greater emphasis will be placed on discussing impacts on minority and low-income populations when preparing NEPA documents such as EISs, supplemental EISs, and, where appropriate, EAs. Commission requirements regarding environmental justice reviews will be reevaluated and may be revised after receipt of the CEQ guidance.

IV. Discussion of Regulatory Requirements

A. General Requirements

In this final rule, the regulatory requirements for performing a NEPA review for a license renewal application are similar to the NEPA review requirements for other major plant licensing actions. Consistent with the current NEPA practice for major plant licensing actions, this amendment to 10 CFR Part 51 requires the applicant to submit an environmental report that analyzes the environmental impacts associated with the proposed action, considers alternatives to the proposed action, and evaluates any alternatives for reducing adverse environmental effects. Additionally, the amendment requires the NRC staff to prepare a supplemental environmental impact statement for the proposed action, issue the statement in draft for public comment, and issue a final statement after considering public comments on the draft.

The amendment deviates from NRC's current NEPA review practice in some areas. First, the amendment codifies certain environmental impacts associated with license renewal that were analyzed in NUREG-1437, "Generic Environmental Impact Statement for License Renewal at Nuclear Plants" (xxxx 1996). Accordingly, absent new and significant information, the analyses for certain impacts codified by this rulemaking need only be incorporated by reference in an applicant's environmental report for license renewal and in the Commission's (including NRC staff, adjudicatory officers, and the Commission itself) draft and final SEIS and other environmental documents developed for

the proceeding. Secondly, the amendment reflects the Commission's decision to limit its NEPA review for license renewal to a consideration of the environmental effects of the proposed action and alternatives to the proposed action. Finally, the amendment contains the decision standard that the Commission will use in determining the acceptability of the environmental impacts of individual license renewals.

The Commission and the applicant will consider severe accident mitigation alternatives to reduce or mitigate environmental impacts for any plant for which severe accident mitigation alternatives have not been previously considered in an environmental impact statement or related supplement or in an environmental assessment. The Commission has concluded that, for license renewal, the issues of need for power and utility economics should be reserved for State and utility officials to decide. Accordingly, the NRC will not conduct an analysis of these issues in the context of license renewal or perform traditional cost-benefit balancing in license renewal NEPA reviews. Finally, in a departure from the approach presented in the proposed rule, this final rule does not codify any conclusions regarding the subject of alternatives. Consideration of and decisions regarding alternatives will occur at the site-specific stage. The discussion below addresses the specific regulatory requirements of this amendment and any conforming changes to 10 CFR Part 51 to implement the Commission's decision to eliminate cost-benefit balancing from license renewal NEPA reviews.

B. The Environmental Report

1. Environmental Impacts of License Renewal

Through this final rule, the NRC has amended 10 CFR 51.53 to require an applicant for license renewal to submit an environmental report with its application. This environmental report must contain an analysis of the environmental impacts of renewing a license, the environmental impacts of alternatives, and mitigation alternatives. In preparing the analysis of environmental impacts contained in the environmental report, the applicant should refer to the data provided in Appendix B to 10 CFR Part 51, which has been added to NRC's regulations as part of this rulemaking. The applicant is not required to provide an analysis in the environmental report of those issues identified as Category 1 issues in Table B-1 in Appendix B. For those issues identified as Category 2 in Table B-1, the applicant must provide a specified additional analysis beyond that contained in Table B-1. In this final rule, 10 CFR 51.53(c)(3)(ii) specifies the subject areas of the analysis that must be addressed for the Category 2 issues.

Pursuant to 10 CFR 51.45(c), 10 CFR 51.53(c)(2) requires the applicant to consider possible actions to mitigate the adverse impacts associated with the proposed action. This consideration is limited to designated Category 2 matters. Pursuant to 10 CFR 51.45(d), the environmental report must include a discussion of the status of compliance with applicable Federal, State, and

local environmental standards. Also, 10 CFR 51.53(c)(2) specifically excludes from consideration in the environmental report the issues of need for power, the economic costs and benefits of the proposed action, economic costs and benefits of alternatives to the proposed action, or other issues not related to environmental effects of the proposed action and associated alternatives. In addition, the requirements in 10 CFR 51.45 are consistent with the exclusion of economic issues in 10 CFR 51.53(c)(2).

2. Consideration of Alternatives

Pursuant to 10 CFR 51.45(c), 10 CFR 51.53(c)(2) requires the applicant to consider the environmental impacts of alternatives to license renewal in the environmental report. The treatment of alternatives in the environmental report should be limited to the environmental impacts of such alternatives. The amended regulations do not require a discussion of the economic costs and benefits of these alternatives in the environmental report for the operating license renewal stage except as necessary to determine whether an alternative should be included in the range of alternatives considered or whether certain mitigative actions are appropriate. The analysis should demonstrate consideration of a reasonable set of alternatives to license renewal. In preparing the alternatives analysis, the applicant may consider information regarding alternatives in NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (xxxx 1996).

The Commission has developed a new decision standard to be applied in environmental impact statements for license renewal as discussed in Section IV.C.2. The amended regulations for license renewal do not require applicants to apply this decision standard to the information generated in their environmental report (although the applicant is not prohibited from doing so if it desires). However, the NRC staff will use the information contained in the environmental report in preparing the environmental impact statement upon which the Commission will base its final decision.

3. Consideration of Mitigation Alternatives

Consistent with the NRC's current NEPA practice, an applicant must include a consideration of alternatives to mitigate adverse environmental impacts in its environmental report. However, for license renewal, the Commission has generically considered mitigation for environmental issues associated with renewal and has concluded that no additional site-specific consideration of mitigation is necessary for many issues. The Commission's consideration of mitigation for each issue included identification of current activities that adequately mitigate impacts and evaluation of other mitigation techniques that might or might not be warranted, depending on such factors as the size of the impact and the cost of the technique. The Commission has considered mitigation for all impacts designated as Category 1 in Table B-1.

Therefore, a license renewal applicant need not address mitigation for issues so designated.

C. Supplemental Environmental Impact Statement

This amendment also requires that the Commission prepare a supplemental environmental impact statement (SEIS), consistent with 10 CFR 51.20(b)(2). This statement will serve as the Commission's independent analysis of the environmental impacts of license renewal as well as a comparison of these impacts to the environmental impacts of alternatives. This document will also present the preliminary recommendation by the NRC staff regarding the proposed action. Consistent with the revisions to 10 CFR 51.45 and 51.53 discussed above in regard to the applicant's environmental report, this rulemaking revises portions of 10 CFR 51.71 and 51.95 to reflect the Commission's approach to addressing the environmental impacts of license renewal.

The issues of need for power, the economic costs and benefits of the proposed action, and economic costs and benefits of alternatives to the proposed action are specifically excluded from consideration in the supplemental environmental impact statement for license renewal by 10 CFR 51.95(c), except as these costs and benefits are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation. The supplemental environmental impact statement does not need to discuss issues other than

environmental effects of the proposed action and associated alternatives. This rule amends the requirements in 10 CFR 51.71(d) and (e) so that they are consistent with the exclusion of economic issues in 10 CFR 51.95(c). Additionally, 10 CFR 51.95 has been amended to allow information from previous NRC site-specific environmental reviews, as well as NRC final generic environmental impact statements, to be referenced in supplemental environmental impact statements.

1. Public Scoping and Public Comments on the SEIS

Consistent with NRC's current NEPA practice, the Commission will hold a public meeting in order to inform the local public of the proposed action and receive comments. In addition, the SEIS will be issued in draft for public comment in accordance with 10 CFR 51.91 and 51.93. In both the public scoping process and the public comment process, the Commission will accept comments on all previously analyzed issues and information codified in Table B-1 of Appendix B to 10 CFR Part 51 and will determine whether these comments provide any information that is new and significant compared with that previously considered in the GEIS. If the comments are determined to provide new and significant information bearing on the previous analysis in the GEIS, these comments will be considered and appropriately factored into the Commission's analysis in the SEIS. Public comments on the site-specific additional

information provided by the applicant regarding Category 2 issues will be considered in the SEIS.

2. Commission's Analysis and Preliminary Recommendation

The Commission's draft SEIS will include its analysis of the environmental impacts of the proposed license renewal action and the environmental impacts of the alternatives to the proposed action. With the exception of offsite radiological impacts for collective effects and the disposal of spent fuel and high level waste, the Commission will integrate the codified environmental impacts of license renewal as provided in Table B-1 of Appendix B to 10 CFR Part 51 (supplemented by the underlying analyses in the GEIS), the appropriate site-specific analyses of Category 2 issues, and any new issues identified during the scoping and public comment process. The results of this integration process will be utilized to arrive at a conclusion regarding the sum of the environmental impacts associated with license renewal. These impacts will then be compared, quantitatively or qualitatively as appropriate, with the environmental impacts of the considered alternatives. The analysis of alternatives in the SEIS will be limited to the environmental impacts of these alternatives and will be prepared in accordance with 10 CFR 51.71 and Subpart A of Appendix A to 10 CFR Part 51. The analysis of impacts of alternatives provided in the GEIS may be referenced in the SEIS as appropriate. The alternatives discussed in the GEIS include a reasonable

range of different methods for power generation. The analysis in the draft SEIS will consider mitigation actions for designated Category 2 matters and will consider the status of compliance with Federal, State, and local environmental requirements as required by 10 CFR 51.71(d). Consistent with 10 CFR 51.71(e), the draft supplemental environmental impact statement must contain a preliminary recommendation regarding license renewal based on consideration of the information on the environmental impacts of license renewal and of alternatives contained in the SEIS. In order to reach its recommendation, the NRC staff must determine whether the adverse environmental impacts of license renewal are so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable. This decision standard is contained in 10 CFR 51.95(c)(4).

3. Final Supplemental Environmental Impact Statement

The Commission will issue a final supplemental environmental impact statement for a license renewal application in accordance with 10 CFR 51.91 and 51.93 after considering the public comments related to new issues identified from the scoping and public comment process, Category 2 issues, and any new and significant information regarding previously analyzed and codified Category 1 issues. Pursuant to 10 CFR 51.102 and 51.103, the Commission will provide a record of its decision regarding the environmental impacts of the proposed action. In making a final decision, the Commission must determine

whether the adverse environmental impacts of license renewal (when compared with the environmental impacts of other energy generating alternatives) are so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable.

D. NEPA Review for Activities Outside NRC License Renewal Approval Scope

The Commission wishes to clarify that any activity that requires NRC approval and is not specifically required for NRC's action regarding management of the effects of aging on certain passive long-lived structures and components in the period of extended operation must be subject to a separate NEPA review. The actions subject to NRC approval for license renewal are limited to continued operation consistent with the plant design and operating conditions for the current operating license and to the performance of specific activities and programs necessary to manage the effects of aging on the passive, long-lived structures and components identified in accordance with 10 CFR Part 54. Accordingly, the GEIS does not serve as the NEPA review for other activities or programs outside the scope of NRC's Part 54 license renewal review. The separate NEPA review must be prepared regardless of whether the action is necessary as a consequence of receiving a renewed license, even if the activity were specifically addressed in the GEIS. For example, the environmental impacts of spent fuel pool expansion are addressed in the GEIS in the context of the environmental consequences of approving a

renewed operating license, rather than in the context of a specific application to expand spent fuel pool capacity, which would require a separate NEPA review.

These separate NEPA reviews may reference and otherwise use applicable environmental information contained in the GEIS. For example, an EA prepared for a separate spent fuel pool expansion request may use the information in the GEIS to support a finding of no significant impact.

V. Availability of Documents

The principal documents supporting this supplementary information are as follows:

(1) NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (xxxx 1996).

(2) NUREG-1529, "Public Comments on the Proposed 10 CFR Part 51 Rule for Renewal of Nuclear Power Plant Operating Licenses and Supporting Documents; Review of Concerns and NRC Staff Response" (xxxx 1996).

(3) NUREG-1440, "Regulatory Analysis of Amendments to Regulations Concerning the Environmental Review for Renewal of Nuclear Power Plant Operating Licenses" (xxxx 1996).

Copies of all documents cited in the supplementary information are available for inspection and for copying for a fee in the NRC Public Document Room, 2120 L Street NW. (Lower Level), Washington, DC. In addition, copies of NRC final documents cited here may be purchased from the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082. Copies are also available for purchase from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

VI. Finding of No Significant Environmental Impact: Availability

The NRC has determined that this final rule is the type of action described as a categorical exclusion in 10 CFR 51.22(c)(3). Therefore, neither an environmental impact statement nor an environmental assessment has been prepared for this regulation. This action is procedural in nature and pertains only to the type of environmental information to be reviewed.

VII. Paperwork Reduction Act Statement

This final rule amends information collection requirements that are subject to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). These requirements were approved by the Office of Management and Budget, approval number 3150-0021.

The public reporting burden for this collection of information is estimated to average 5,000 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Information and Records Management Branch (T6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0021), Office of Management and Budget, Washington, DC 20503.

VIII. Regulatory Analysis

The Commission has prepared a regulatory analysis for this final rule. The analysis examines the costs and benefits of the alternatives considered by the Commission. The two alternatives considered were:

(A) Retaining the existing 10 CFR Part 51 review process for license renewal, which requires that all reviews be on a plant-specific basis; and

(B) Amending 10 CFR Part 51 to allow a portion of the environmental review to be conducted on a generic basis.

The conclusions of the regulatory analysis show substantial cost savings of alternative (B) over alternative (A). The analysis, NUREG-1440, is available for inspection in the NRC Public Document Room, 2120 L Street NW.

(Lower Level), Washington, DC. Copies of the analysis are available as described in Section V.

XI. Regulatory Flexibility Act Certification

As required by the Regulatory Flexibility Act of 1980, 5 U.S.C. 605(b), the Commission certifies that this final rule will not have a significant impact on a substantial number of small entities. The final rule states the application procedures and environmental information to be submitted by nuclear power plant licensees to facilitate NRC's obligations under NEPA. Nuclear power plant licensees do not fall within the definition of small businesses as defined in Section 3 of the Small Business Act, 15 U.S.C. 632, or the Commission's Size Standards, April 11, 1995 (60 FR 18344).

X. Backfit Analysis

The NRC has determined that these amendments do not involve any provisions which would impose backfits as defined in 10 CFR 50.109(a)(1); therefore, a backfit analysis need not be prepared.

List of Subjects in 10 CFR Part 51

Administrative practice and procedure, Environmental impact statement, Nuclear materials, Nuclear power plants and reactors, Reporting and recordkeeping requirements.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974, as amended; the National Environmental Policy Act of 1969, as amended; and 5 U.S.C. 552 and 553, the NRC is adopting the following amendments to 10 CFR Part 51.

PART 51 -- ENVIRONMENTAL PROTECTION REGULATIONS FOR DOMESTIC LICENSING AND RELATED REGULATORY FUNCTIONS

1. The authority citation for Part 51 continues to read as follows:

AUTHORITY: Sec. 161, 68 Stat. 948, as amended, Sec. 1701, 106 Stat. 2951, 2952, 2953 (42 U.S.C. 2201, 2297f); secs. 201, as amended, 202, 88 Stat. 1242, as amended, 1244 (42 U.S.C. 5841, 5842).

Subpart A also issued under National Environmental Policy Act of 1969, secs. 102, 104, 105, 83 Stat. 853-854, as amended (42 U.S.C. 4332, 4334, 4335); and Pub. L. 95-604, Title II, 92 Stat. 3033-3041. Sections 51.20, 51.30, 51.60, 51.61, 51.80, and 51.97 also issued under secs. 135, 141, Pub.

L. 97-425, 96 Stat. 2232, 2241, and sec. 148, Pub. L. 100-203, 101 Stat. 1330-223 (42 U.S.C. 10155, 10161, 10168). Section 51.22 also issued under sec. 274, 73 Stat. 688, as amended by 92 Stat. 3036-3038 (42 U.S.C. 2021) and under Nuclear Waste Policy Act of 1982, sec. 121, 96 Stat. 2228 (42 U.S.C. 10141). Sections 51.43, 51.67, and 51.109 also issued under Nuclear Waste Policy Act of 1982, sec. 114(f), 96 Stat. 2216, as amended (42 U.S.C. 10134(f)).

2. Section 51.45 is amended by revising paragraph (c) to read as follows:

§ 51.45 Environmental report.

* * * * *

(c) Analysis. The environmental report shall include an analysis that considers and balances the environmental effects of the proposed action, the environmental impacts of alternatives to the proposed action, and alternatives available for reducing or avoiding adverse environmental effects. Except for environmental reports prepared at the license renewal stage pursuant to § 51.53(c), the analysis in the environmental report should also include consideration of the economic, technical, and other benefits and costs of the proposed action and of alternatives. Environmental reports prepared at the license renewal stage pursuant to § 51.53(c) need not discuss the economic or technical benefits and costs of either the proposed action or alternatives except insofar as such benefits and costs are either essential for a determination regarding the inclusion of an alternative in the range of

alternatives considered or relevant to mitigation. In addition, environmental reports prepared pursuant to § 51.53(c) need not discuss other issues not related to the environmental effects of the proposed action and alternatives. The analyses for environmental reports shall, to the fullest extent practicable, quantify the various factors considered. To the extent that there are important qualitative considerations or factors that cannot be quantified, those considerations or factors shall be discussed in qualitative terms. The environmental report should contain sufficient data to aid the Commission in its development of an independent analysis.

* * * * *

3. Section 51.53 is revised to read as follows:

§ 51.53 Postconstruction environmental reports.

(a) General. Any environmental report prepared under the provisions of this section may incorporate by reference any information contained in a prior environmental report or supplement thereto that relates to the production or utilization facility or any information contained in a final environmental document previously prepared by the NRC staff that relates to the production or utilization facility. Documents that may be referenced include, but are not limited to, the final environmental impact statement; supplements to the final environmental impact statement, including supplements prepared at the license renewal stage; NRC staff-prepared final generic environmental impact statements; and environmental assessments and records of decisions prepared in

connection with the construction permit, the operating license, and any license amendment for that facility.

(b) Operating license stage. Each applicant for a license to operate a production or utilization facility covered by § 51.20 shall submit with its application the number of copies specified in § 51.55 of a separate document entitled "Supplement to Applicant's Environmental Report--Operating License Stage," which will update "Applicant's Environmental Report--Construction Permit Stage." Unless otherwise required by the Commission, the applicant for an operating license for a nuclear power reactor shall submit this report only in connection with the first licensing action authorizing full-power operation. In this report, the applicant shall discuss the same matters described in §§ 51.45, 51.51, and 51.52, but only to the extent that they differ from those discussed or reflect new information in addition to that discussed in the final environmental impact statement prepared by the Commission in connection with the construction permit. No discussion of need for power, or of alternative energy sources, or of alternative sites for the facility, or of any aspect of the storage of spent fuel for the facility within the scope of the generic determination in § 51.23(a) and in accordance with § 51.23(b) is required in this report.

(c) Operating license renewal stage.

(1) Each applicant for renewal of a license to operate a nuclear power plant under Part 54 of this chapter shall submit with its application the number of copies specified in § 51.55 of a separate document entitled "Applicant's Environmental Report--Operating License Renewal Stage."

(2) The report must contain a description of the proposed action, including the applicant's plans to modify the facility or its administrative control procedures as described in accordance with § 54.21 of this chapter. This report must describe in detail the modifications directly affecting the environment or affecting plant effluents that affect the environment. In addition, the applicant shall discuss in this report the environmental impacts of alternatives and any other matters described in § 51.45. The report is not required to include discussion of (1) need for power or (2) the economic costs and economic benefits of the proposed action or of alternatives to the proposed action except insofar as such costs and benefits are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation. The environmental report need not discuss other issues not related to the environmental effects of the proposed action and the alternatives. In addition, the environmental report need not discuss any aspect of the storage of spent fuel for the facility within the scope of the generic determination in § 51.23(a) and in accordance with § 51.23(b).

(3) For those applicants seeking an initial renewal license and holding either an operating license or construction permit as of June 30, 1995, the environmental report shall include the information required in paragraph (c)(2) of this section subject to the following conditions and considerations:

(i) The environmental report for the operating license renewal stage is not required to contain analyses of the environmental impacts of the license renewal issues identified as Category 1 issues in Appendix B to Subpart A of this part.

(ii) The environmental report must contain analyses of the environmental impacts of the proposed action, including the impacts of refurbishment activities, if any, associated with license renewal and the impacts of operation during the renewal term, for those issues identified as Category 2 issues in Appendix B to Subpart A of this part. The required analyses are as follows:

(A) If the applicant's plant utilizes cooling towers or cooling ponds and withdraws make-up water from a river whose annual flow rate is less than 3.15×10^{12} ft^3/year (9×10^{10} m^3/year), an assessment of the impact of the proposed action on the flow of the river and related impacts on instream and riparian ecological communities must be provided. The applicant shall also provide an assessment of the impacts of the withdrawal of water from the river on alluvial aquifers during low flow.

(B) If the applicant's plant utilizes once-through cooling or cooling pond heat dissipation systems, the applicant shall provide a copy of current Clean Water Act 316(b) determinations and, if necessary, a 316(a) variance in accordance with 40 CFR Part 125, or equivalent State permits and supporting documentation. If the applicant can not provide these documents, it shall assess the impact of the proposed action on fish and shellfish resources resulting from heat shock and impingement and entrainment.

(C) If the applicant's plant uses Ranney wells or pumps more than 100 gallons of ground water per minute, an assessment of the impact of the proposed action on ground-water use must be provided.

(D) If the applicant's plant is located at an inland site and utilizes cooling ponds, an assessment of the impact of the proposed action on groundwater quality must be provided.

(E) All license renewal applicants shall assess the impact of refurbishment and other license-renewal-related construction activities on important plant and animal habitats. Additionally, the applicant shall assess the impact of the proposed action on threatened or endangered species in accordance with the Endangered Species Act.

(F) If the applicant's plant is located in or near a nonattainment or maintenance area, an assessment of vehicle exhaust emissions anticipated at the time of peak refurbishment workforce must be provided in accordance with the Clean Air Act as amended.

(G) If the applicant's plant uses a cooling pond, lake, or canal or discharges into a river having an annual average flow rate of less than 3.15×10^{12} ft^3/year (9×10^{10} m^3/year), an assessment of the impact of the proposed action on public health from thermophilic organisms in the affected water must be provided.

(H) If the applicant's transmission lines that were constructed for the specific purpose of connecting the plant to the transmission system do not meet the recommendations of the National Electric Safety Code for preventing electric shock from induced currents, an assessment of the impact of the proposed action on the potential shock hazard from the transmission lines must be provided.

(I) An assessment of the impact of the proposed action on housing availability, land-use, and public schools (impacts from refurbishment activities only) within the vicinity of the plant must be provided. Additionally, the applicant shall provide an assessment of the impact of population increases attributable to the proposed project on the public water supply.

(J) All applicants shall assess the impact of the proposed project on local transportation during periods of license renewal refurbishment activities.

(K) All applicants shall assess whether any historic or archaeological properties will be affected by the proposed project.

(L) If the staff has not previously considered severe accident mitigation alternatives for the applicant's plant in an environmental impact statement or related supplement or in an environmental assessment, a consideration of alternatives to mitigate severe accidents must be provided.

(M) The environmental effects of transportation of fuel and waste shall be reviewed in accordance with § 51.52.

(iii) The report must contain a consideration of alternatives for reducing adverse impacts, as required by § 51.45(c), for all Category 2 license renewal issues in Appendix B to Subpart A of this part. No such consideration is required for Category 1 issues in Appendix B to Subpart A of this part.

(iv) The environmental report must contain any new and significant information regarding the environmental impacts of license renewal of which the applicant is aware.

(d) Postoperating license stage. Each applicant for a license amendment authorizing the decommissioning of a production or utilization facility covered by § 51.20 and each applicant for a license or license amendment to store spent fuel at a nuclear power plant after expiration of the operating license for the nuclear power plant shall submit with its application the number of copies specified in § 51.55 of a separate document entitled "Supplement to Applicant's Environmental Report--Post Operating License Stage." This supplement will update "Supplement to Applicant's Environmental Report--Operating License Stage" and "Applicant's Environmental

Report--Operating License Renewal Stage," as appropriate, to reflect any new information or significant environmental change associated with the applicant's proposed decommissioning activities or with the applicant's proposed activities with respect to the planned storage of spent fuel. Unless otherwise required by the Commission, in accordance with the generic determination in § 51.23(a) and the provisions in § 51.23(b), the applicant shall address only the environmental impact of spent fuel storage for the term of the license.

4. In Section 51.55, paragraph (a) is revised to read as follows:

§ 51.55 Environmental report--number of copies; distribution.

(a) Each applicant for a license to construct and operate a production or utilization facility covered by paragraphs (b)(1), (b)(2), (b)(3), or (b)(4) of § 51.20, each applicant for renewal of an operating license for a nuclear power plant, each applicant for a license amendment authorizing the decommissioning of a production or utilization facility covered by § 51.20, and each applicant for a license or license amendment to store spent fuel at a nuclear power plant after expiration of the operating license for the nuclear power plant shall submit to the Director of the Office of Nuclear Reactor Regulation or the Director of the Office of Nuclear Material Safety and Safeguards, as appropriate, 41 copies of an environmental report or any supplement to an environmental report. The applicant shall retain an additional 109 copies of the environmental report or any supplement to the

environmental report for distribution to parties and Boards in the NRC proceedings; Federal, State, and local officials; and any affected Indian tribes, in accordance with written instructions issued by the Director of the Office of Nuclear Reactor Regulation or the Director of the Office Nuclear Material Safety and Safeguards, as appropriate.

* * * * *

5. In Section 51.71, paragraphs (d) and (e) are revised to read as follows:

§ 51.71 Draft environmental impact statement--contents.

* * * * *

(d) Analysis. The draft environmental impact statement will include a preliminary analysis that considers and weighs the environmental effects of the proposed action; the environmental impacts of alternatives to the proposed action; and alternatives available for reducing or avoiding adverse environmental effects. Except for supplemental environmental impact statements for the operating license renewal stage prepared pursuant to § 51.95(c), draft environmental impact statements should also include consideration of the economic, technical, and other benefits and costs of the proposed action and alternatives and indicate what other interests and considerations of Federal policy, including factors not related to environmental quality if applicable, are relevant to the consideration of environmental effects of the proposed action identified pursuant to

paragraph (a) of this section. Supplemental environmental impact statements prepared at the license renewal stage pursuant to § 51.95(c) need not discuss the economic or technical benefits and costs of either the proposed action or alternatives except insofar as such benefits and costs are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation. In addition, the supplemental environmental impact statement prepared at the license renewal stage need not discuss other issues not related to the environmental effects of the proposed action and associated alternatives. The draft supplemental environmental impact statement for license renewal prepared pursuant to § 51.95(c) will rely on conclusions as amplified by the supporting information in the GEIS for issues designated as Category 1 in Appendix B to Subpart A of this part. The draft supplemental environmental impact statement must contain an analysis of those issues identified as Category 2 in Appendix B to Subpart A of this part that are open for the proposed action. The analysis for all draft environmental impact statements will, to the fullest extent practicable, quantify the various factors considered. To the extent that there are important qualitative considerations or factors that cannot be quantified, these considerations or factors will be discussed in qualitative terms. Due consideration will be given to compliance with environmental quality standards and requirements that have been imposed by Federal, State, regional, and local agencies having responsibility for environmental protection, including applicable zoning and land-use regulations and water pollution limitations or

requirements promulgated or imposed pursuant to the Federal Water Pollution Control Act. The environmental impact of the proposed action will be considered in the analysis with respect to matters covered by such standards and requirements irrespective of whether a certification or license from the appropriate authority has been obtained.[3] While satisfaction of Commission standards and criteria pertaining to radiological effects will be necessary to meet the licensing requirements of the Atomic Energy Act, the analysis will, for the purposes of NEPA, consider the radiological effects of the proposed action and alternatives.

(e) Preliminary recommendation. The draft environmental impact statement normally will include a preliminary recommendation by the NRC staff respecting the proposed action. This preliminary recommendation will be based

[3] Compliance with the environmental quality standards and requirements of the Federal Water Pollution Control Act (imposed by EPA or designated permitting states) is not a substitute for and does not negate the requirement for NRC to weigh all environmental effects of the proposed action, including the degradation, if any, of water quality, and to consider alternatives to the proposed action that are available for reducing adverse effects. Where an environmental assessment of aquatic impact from plant discharges is available from the permitting authority, the NRC will consider the assessment in its determination of the magnitude of environmental impacts for striking an overall cost-benefit balance at the construction permit and operating license stages, and in its determination of whether the adverse environmental impacts of license renewal are so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable at the license renewal stage. When no such assessment of aquatic impacts is available from the permitting authority, NRC will establish on its own or in conjunction with the permitting authority and other agencies having relevant expertise the magnitude of potential impacts for striking an overall cost-benefit balance for the facility at the construction permit and operating license stages, and in its determination of whether the adverse environmental impacts of license renewal are so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable at the license renewal stage.

on the information and analysis described in paragraphs (a) through (d) of this section and §§ 51.75, 51.76, 51.80, 51.85, and 51.95, as appropriate, and will be reached after considering the environmental effects of the proposed action and reasonable alternatives,[4] and, except for supplemental environmental impact statements for the operating license renewal stage prepared pursuant to § 51.95(c), after weighing the costs and benefits of the proposed action. In lieu of a recommendation, the NRC staff may indicate in the draft statement that two or more alternatives remain under consideration.

6. In Section 51.75, redesignate footnote 4 as footnote 5.

7. Section 51.95 is revised to read as follows:

§ 51.95 Postconstruction environmental impact statements.

(a) General. Any supplement to a final environmental impact statement or any environmental assessment prepared under the provisions of this section may incorporate by reference any information contained in a final environmental document previously prepared by the NRC staff that relates to the same production or utilization facility. Documents that may be referenced include, but are not limited to, the final environmental impact statement; supplements to the final environmental impact statement, including supplements prepared at the operating license stage; NRC staff-prepared final generic environmental impact statements; environmental assessments and records of

[4]The consideration of reasonable alternatives to a proposed action involving nuclear power reactors (e.g., alternative energy sources) is intended to assist the NRC in meeting its NEPA obligations and does not preclude any State authority from making separate determinations with respect to these alternatives and in no way preempts, displaces, or affects the authority of States or other Federal agencies to address these issues.

decisions prepared in connection with the construction permit, the operating license, and any license amendment for that facility. A supplement to a final environmental impact statement will include a request for comments as provided in § 51.73.

(b) Initial operating license stage. In connection with the issuance of an operating license for a production or utilization facility, the NRC staff will prepare a supplement to the final environmental impact statement on the construction permit for that facility, which will update the prior environmental review. The supplement will only cover matters that differ from the final environmental impact statement or that reflect significant new information concerning matters discussed in the final environmental impact statement. Unless otherwise determined by the Commission, a supplement on the operation of a nuclear power plant will not include a discussion of need for power, or of alternative energy sources, or of alternative sites, or of any aspect of the storage of spent fuel for the nuclear power plant within the scope of the generic determination in § 51.23(a) and in accordance with § 51.23(b), and will only be prepared in connection with the first licensing action authorizing full-power operation.

(c) Operating license renewal stage. In connection with the renewal of an operating license for a nuclear power plant under Part 54 of this chapter, the Commission shall prepare a supplement to the Commission's NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (xxxx 1996).

(1) The supplemental environmental impact statement for the operating license renewal stage shall address those issues as required by § 51.71. In addition, the NRC staff must comply with 40 CFR 1506.6(b)(3) in conducting the additional scoping process as required by § 51.71(a).

(2) The supplemental environmental impact statement for license renewal is not required to include discussion of (1) need for power or (2) the economic costs and economic benefits of the proposed action or of alternatives to the proposed action except insofar as such benefits and costs are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation. In addition, the supplemental environmental impact statement prepared at the license renewal stage need not discuss other issues not related to the environmental effects of the proposed action and the alternatives, or any aspect of the storage of spent fuel for the facility within the scope of the generic determination in § 51.23(a) and in accordance with § 51.23(b). The analysis of alternatives in the supplemental environmental impact statement should be limited to the environmental impacts of such alternatives and should otherwise be prepared in accordance with § 51.71 and Appendix A to Subpart A of this part.

(3) The supplemental environmental impact statement shall be issued as a final impact statement in accordance with §§ 51.91 and 51.93 after considering any significant new information relevant to the proposed action contained in the supplement or incorporated by reference.

(4) The supplemental environmental impact statement must contain the NRC staff's recommendation regarding the environmental acceptability of the license renewal action. In order to make its recommendation and final conclusion on the proposed action, the NRC staff, adjudicatory officers, and Commission shall integrate the conclusions, as amplified by (1) the supporting information in the generic environmental impact statement for issues designated Category 1 (with the exception of offsite radiological impacts for collective effects and the disposal of spent fuel and high level waste) or resolved Category 2, (2) information developed for those open Category 2 issues applicable to the plant in accordance with § 51.53(c)(3)(ii), and (3) any significant new information. Given this information, the NRC staff, adjudicatory officers, and Commission shall determine whether or not the adverse environmental impacts of license renewal are so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable.

(d) Postoperating license stage. In connection with an amendment to an operating license authorizing the decommissioning of a production or utilization facility covered by § 51.20 or with the issuance, amendment, or renewal of a license to store spent fuel at a nuclear power plant after expiration of the operating license for the nuclear power plant, the NRC staff will prepare a supplemental environmental impact statement for the postoperating license stage or an environmental assessment, as appropriate, which will update the prior environmental review. Unless otherwise required

by the Commission, in accordance with the generic determination in § 51.23(a) and the provisions of § 51.23(b), a supplemental environmental impact statement for the postoperating license stage or an environmental assessment, as appropriate, will address the environmental impacts of spent fuel storage only for the term of the license, license amendment, or license renewal applied for.

8. In Section 51.103, paragraph (a)(3) is revised and paragraph (a)(5) is added to read as follows:

§ 51.103 Record of decision--General.

(a) * * * * *

(3) Discuss preferences among alternatives based on relevant factors, including economic and technical considerations where appropriate, the NRC's statutory mission, and any essential considerations of national policy, which were balanced by the Commission in making the decision and state how these considerations entered into the decision.

* * * * *

(5) In making a final decision on a license renewal action pursuant to Part 54 of this chapter, the Commission shall determine whether or not the adverse environmental impacts of license renewal are so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable.

* * * * *

9. Paragraph 4 of Appendix A to Subpart A of 10 CFR Part 51 is revised as follows:

APPENDIX A TO SUBPART A--FORMAT FOR PRESENTATION

OF MATERIAL IN ENVIRONMENTAL IMPACT STATEMENTS

* * * *

4. Purpose of and need for action.

The statement will briefly describe and specify the need for the proposed action. The alternative of no action will be discussed. In the case of nuclear power plant construction or siting, consideration will be given to the potential impact of conservation measures in determining the demand for power and consequent need for additional generating capacity.

* * * *

10. A new Appendix B is added to Subpart A of 10 CFR Part 51 to read as follows:

APPENDIX B TO SUBPART A--ENVIRONMENTAL EFFECT OF RENEWING

THE OPERATING LICENSE OF A NUCLEAR POWER PLANT

The Commission has assessed the environmental impacts associated with granting a renewed operating license for a nuclear power plant to a licensee who holds an operating license as of June 30, 1992, or who holds an operating license for Bellefonte Unit 1 or 2, Comanche Peak Unit 2, or Watts Bar Unit 1 or 2. Table B-1 summarizes the Commission's findings on the scope and

magnitude of environmental impacts of renewing the operating license for a nuclear power plant as required by section 102(2) of the National Environmental Policy Act of 1969, as amended. Table B-1, subject to an evaluation of those issues identified in Category 2 as requiring further analysis and possible significant new information, represents the analysis of the environmental impacts associated with renewal of any operating license and is to be used in accordance with § 51.95(c). On a 10 year cycle, the Commission intends to review the material in this appendix and update it if necessary. A scoping notice must be published in the Federal Register indicating the results of the NRC's review and inviting public comments and proposals for other areas that should be updated.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
Surface Water Quality, Hydrology, and Use (for all plants)		
Impacts of refurbishment on surface water quality	1	SMALL. Impacts are expected to be negligible during refurbishment because best management practices are expected to be employed to control soil erosion and spills.
Impacts of refurbishment on surface water use	1	SMALL. Water use during refurbishment will not increase appreciably or will be reduced during plant outage.
Altered current patterns at intake and discharge structures	1	SMALL. Altered current patterns have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Altered salinity gradients	1	SMALL. Salinity gradients have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Altered thermal stratification of lakes	1	SMALL. Generally, lake stratification has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.
Temperature effects on sediment transport capacity	1	SMALL. These effects have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Scouring caused by discharged cooling water	1	SMALL. Scouring has not been found to be a problem at most operating nuclear power plants and has caused only localized effects at a few plants. It is not expected to be a problem during the license renewal term.
Eutrophication	1	SMALL. Eutrophication has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.
Discharge of chlorine or other biocides	1	SMALL. Effects are not a concern among regulatory and resource agencies, and are not expected to be a problem during the license renewal term.
Discharge of sanitary wastes and minor chemical spills	1	SMALL. Effects are readily controlled through NPDES permit and periodic modifications, if needed, and are not expected to be a problem during the license renewal term.

Footnotes at end of table.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
Discharge of other metals in waste water	1	SMALL. These discharges have not been found to be a problem at operating nuclear power plants with cooling-tower-based heat dissipation systems and have been satisfactorily mitigated at other plants. They are not expected to be a problem during the license renewal term.
Water use conflicts (plants with once-through cooling systems)	1	SMALL. These conflicts have not been found to be a problem at operating nuclear power plants with once-through heat dissipation systems.
Water use conflicts (plants with cooling ponds or cooling towers using make-up water from a small river with low flow)	2	SMALL OR MODERATE. The issue has been a concern at nuclear power plants with cooling ponds and at plants with cooling towers. Impacts on instream and riparian communities near these plants could be of moderate significance in some situations. See § 51.53(c)(3)(ii)(A).
		Aquatic Ecology (for all plants)
Refurbishment	1	SMALL. During plant shutdown and refurbishment there will be negligible effects on aquatic biota because of a reduction of entrainment and impingement of organisms or a reduced release of chemicals.
Accumulation of contaminants in sediments or biota	1	SMALL. Accumulation of contaminants has been a concern at a few nuclear power plants but has been satisfactorily mitigated by replacing copper alloy condenser tubes with those of another metal. It is not expected to be a problem during the license renewal term.
Entrainment of phytoplankton and zooplankton	1	SMALL. Entrainment of phytoplankton and zooplankton has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.
Cold shock	1	SMALL. Cold shock has been satisfactorily mitigated at operating nuclear plants with once-through cooling systems, has not endangered fish populations or been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds, and is not expected to be a problem during the license renewal term.
Thermal plume barrier to migrating fish	1	SMALL. Thermal plumes have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.

Footnotes at end of table.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
Distribution of aquatic organisms	1	SMALL. Thermal discharge may have localized effects but is not expected to effect the larger geographical distribution of aquatic organisms.
Premature emergence of aquatic insects	1	SMALL. Premature emergence has been found to be a localized effect at some operating nuclear power plants but has not been a problem and is not expected to be a problem during the license renewal term.
Gas supersaturation (gas bubble disease)	1	SMALL. Gas supersaturation was a concern at a small number of operating nuclear power plants with once-through cooling systems but has been satisfactorily mitigated. It has not been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds and is not expected to be a problem during the license renewal term.
Low dissolved oxygen in the discharge	1	SMALL. Low dissolved oxygen has been a concern at one nuclear power plant with a once-through cooling system but has been effectively mitigated. It has not been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds and is not expected to be a problem during the license renewal term.
Losses from predation, parasitism, and disease among organisms exposed to sublethal stresses	1	SMALL. These types of losses have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Stimulation of nuisance organisms (e.g., shipworms)	1	SMALL. Stimulation of nuisance organisms has been satisfactorily mitigated at the single nuclear power plant with a once-through cooling system where previously it was a problem. It has not been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds and is not expected to be a problem during the license renewal term.

Footnotes at end of table.

Table B-1.

Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
Aquatic Ecology (for plants with once-through and cooling pond heat dissipation systems)		
Entrainment of fish and shellfish in early life stages	2	SMALL, MODERATE, OR LARGE. The impacts of entrainment are small at many plants but may be moderate or even large at a few plants with once-through and cooling-pond cooling systems. Further, ongoing efforts in the vicinity of these plants to restore fish populations may increase the numbers of fish susceptible to intake effects during the license renewal period, such that entrainment studies conducted in support of the original license may no longer be valid. See § 51.53(c)(3)(ii)(B).
Impingement of fish and shellfish	2	SMALL, MODERATE, OR LARGE. The impacts of impingement are small at many plants but may be moderate or even large at a few plants with once-through and cooling-pond cooling systems. See § 51.53(c)(3)(ii)(B).
Heat shock	2	SMALL, MODERATE, OR LARGE. Because of continuing concerns about heat shock and the possible need to modify thermal discharges in response to changing environmental conditions, the impacts may be of moderate or large significance at some plants. See § 51.53(c)(3)(ii)(B).
Aquatic Ecology (for plants with cooling-tower-based heat dissipation systems)		
Entrainment of fish and shellfish in early life stages	1	SMALL. Entrainment of fish has not been found to be a problem at operating nuclear power plants with this type of cooling system and is not expected to be a problem during the license renewal term.
Impingement of fish and shellfish	1	SMALL. The impingement has not been found to be a problem at operating nuclear power plants with this type of cooling system and is not expected to be a problem during the license renewal term.
Heat shock	1	SMALL. Heat shock has not been found to be a problem at operating nuclear power plants with this type of cooling system and is not expected to be a problem during the license renewal term.
Ground-water Use and Quality		

Footnotes at end of table.

Table B-1.

Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
Impacts of refurbishment on ground-water use and quality	1	SMALL. Extensive dewatering during the original construction on some sites will not be repeated during refurbishment on any sites. Any plant wastes produced during refurbishment will be handled in the same manner as in current operating practices and are not expected to be a problem during the license renewal term.
Ground-water use conflicts (potable and service water; plants that use <100 gpm)	1	SMALL. Plants using less than 100 gpm are not expected to cause any ground-water use conflicts.
Ground-water use conflicts (potable and service water, and dewatering; plants that use > 100 gpm)	2	SMALL, MODERATE, OR LARGE. Plants that use more than 100 gpm may cause ground-water use conflicts with nearby ground-water users. See § 51.53(c)(3)(ii)(C).
Ground-water use conflicts (plants using cooling towers withdrawing make-up water from a small river)	2	SMALL, MODERATE, OR LARGE. Water use conflicts may result from surface water withdrawals from small water bodies during low flow conditions which may affect aquifer recharge, especially if other ground-water or upstream surface water users come on line before the time of license renewal. See § 51.53(c)(3)(ii)(A).
Ground-water use conflicts (Ranney wells)	2	SMALL, MODERATE, OR LARGE. Ranney wells can result in potential ground-water depression beyond the site boundary. Impacts of large ground-water withdrawal for cooling tower makeup at nuclear power plants using Ranney wells must be evaluated at the time of application for license renewal. See § 51.53(c)(3)(ii)(C).
Ground-water quality degradation (Ranney wells)	1	SMALL. Ground-water quality at river sites may be degraded by induced infiltration of poor-quality river water into an aquifer that supplies large quantities of reactor cooling water. However, the lower quality infiltrating water would not preclude the current uses of ground water and is not expected to be a problem during the license renewal term.
Ground-water quality degradation (saltwater intrusion)	1	SMALL. Nuclear power plants do not contribute significantly to saltwater intrusion.
Ground-water quality degradation (cooling ponds in salt marshes)	1	SMALL. Sites with closed-cycle cooling ponds may degrade ground-water quality. Because water in salt marshes is brackish, this is not a concern for plants located in salt marshes.

Footnotes at end of table.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
Ground-water quality degradation (cooling ponds at inland sites)	2	SMALL, MODERATE, OR LARGE. Sites with closed-cycle cooling ponds may degrade ground-water quality. For plants located inland, the quality of the ground water in the vicinity of the ponds must be shown to be adequate to allow continuation of current uses. See § 51.53(c)(3)(ii)(D).

Footnotes at end of table.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
		Terrestrial Resources
Refurbishment impacts	2	SMALL, MODERATE, OR LARGE. Refurbishment impacts are insignificant if no loss of important plant and animal habitat occurs. However, it cannot be known whether important plant and animal communities may be affected until the specific proposal is presented with the license renewal application. See § 51.53(c)(3)(ii)(E).
Cooling tower impacts on crops and ornamental vegetation	1	SMALL. Impacts from salt drift, icing, fogging, or increased humidity associated with cooling tower operation have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Cooling tower impacts on native plants	1	SMALL. Impacts from salt drift, icing, fogging, or increased humidity associated with cooling tower operation have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Bird collisions with cooling towers	1	SMALL. These collisions have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Cooling pond impacts on terrestrial resources	1	SMALL. Impacts of cooling ponds on terrestrial ecological resources are considered to be of small significance at all sites.
Power line right-of-way management (cutting and herbicide application)	1	SMALL. The impacts of right-of-way maintenance on wildlife are expected to be of small significance at all sites.
Bird collision with power lines	1	SMALL. Impacts are expected to be of small significance at all sites.
Impacts of electromagnetic fields on flora and fauna (plants, agricultural crops, honeybees, wildlife, livestock)	1	SMALL. No significant impacts of electromagnetic fields on terrestrial flora and fauna have been identified. Such effects are not expected to be a problem during the license renewal term.
Floodplains and wetland on power line right of way	1	SMALL. Periodic vegetation control is necessary in forested wetlands underneath power lines and can be achieved with minimal damage to the wetland. No significant impact is expected at any nuclear power plant during the license renewal term.
		Threatened or Endangered Species (for all plants)

Footnotes at end of table.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
Threatened or endangered species	2	SMALL, MODERATE, OR LARGE. Generally, plant refurbishment and continued operation are not expected to adversely affect threatened or endangered species. However, consultation with appropriate agencies would be needed at the time of license renewal to determine whether threatened or endangered species are present and whether they would be adversely affected. See § 51.53(c)(3)(ii)(E).
		Air Quality
Air quality during refurbishment (non-attainment and maintenance areas)	2	SMALL, MODERATE, OR LARGE. Air quality impacts from plant refurbishment associated with license renewal are expected to be small. However, vehicle exhaust emissions could be cause for concern at locations in or near nonattainment or maintenance areas. The significance of the potential impact cannot be determined without considering the compliance status of each site and the numbers of workers expected to be employed during the outage. See § 51.53(c)(3)(ii)(F).
Air quality effects of transmission lines	1	SMALL. Production of ozone and oxides of nitrogen is insignificant and does not contribute measurably to ambient levels of these gases.
		Land Use
Onsite land use	1	SMALL. Projected onsite land use changes required during refurbishment and the renewal period would be a small fraction of any nuclear power plant site and would involve land that is controlled by the applicant.
Power line right of way	1	SMALL. Ongoing use of power line right of ways would continue with no change in restrictions. The effects of these restrictions are of small significance.
		Human Health
Radiation exposures to the public during refurbishment	1	SMALL. During refurbishment, the gaseous effluents would result in doses that are similar to those from current operation. Applicable regulatory dose limits to the public are not expected to be exceeded.

Footnotes at end of table.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
Occupational radiation exposures during refurbishment	1	SMALL. Occupational doses from refurbishment are expected to be within the range of annual average collective doses experienced for pressurized-water reactors and boiling-water reactors. Occupational mortality risk from all causes including radiation is in the mid-range for industrial settings.
Microbiological organisms (occupational health)	1	SMALL. Occupational health impacts are expected to be controlled by continued application of accepted industrial hygiene practices to minimize worker exposures.
Microbiological organisms (public health)(plants using lakes or canals, or cooling towers or cooling ponds that discharge to a small river)	2	SMALL, MODERATE, OR LARGE. These organisms are not expected to be a problem at most operating plants except possibly at plants using cooling ponds, lakes, or canals that discharge to small rivers. Without site-specific data, it is not possible to predict the effects generically. See § 51.53(c)(3)(ii)(G).
Noise	1	SMALL. Noise has not been found to be a problem at operating plants and is not expected to be a problem at any plant during the license renewal term.
Electromagnetic fields, acute effects (electric shock)	2	SMALL, MODERATE, OR LARGE. Electrical shock resulting from direct access to energized conductors or from induced charges in metallic structures have not been found to be a problem at most operating plants and generally are not expected to be a problem during the license renewal term. However, site-specific review is required to determine the significance of the electric shock potential at the site. See § 51.53(c)(3)(ii)(H).
Electromagnetic fields, chronic effects[5]	NA[4]	UNCERTAIN. Biological and physical studies of 60-Hz electromagnetic fields have not found consistent evidence linking harmful effects with field exposures. However, because the state of the science is currently inadequate, no generic conclusion on human health impacts is possible.[5]
Radiation exposures to public (license renewal term)	1	SMALL. Radiation doses to the public will continue at current levels associated with normal operations.
Occupational radiation exposures (license renewal term)	1	SMALL. Projected maximum occupational doses during the license renewal term are within the range of doses experienced during normal operations and normal maintenance outages, and would be well below regulatory limits.
		Socioeconomics

Footnotes at end of table.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
Housing impacts	2	SMALL, MODERATE, OR LARGE. Housing impacts are expected to be of small significance at plants located in a medium or high population area and not in an area where growth control measures that limit housing development are in effect. Moderate or large housing impacts of the workforce associated with refurbishment may be associated with plants located in sparsely populated areas or in areas with growth control measures that limit housing development. See § 51.53(c)(3)(ii)(I).
Public services: public safety, social services, and tourism and recreation	1	SMALL. Impacts to public safety, social services, and tourism and recreation are expected to be of small significance at all sites.
Public services: public utilities	2	SMALL OR MODERATE. An increased problem with water shortages at some sites may lead to impacts of moderate significance on public water supply availability. See § 51.53(c)(3)(ii)(I).
Public services, education (refurbishment)	2	SMALL, MODERATE, OR LARGE. Most sites would experience impacts of small significance but larger impacts are possible depending on site- and project-specific factors. See § 51.53(c)(3)(ii)(I).
Public services, education (license renewal term)	1	SMALL. Only impacts of small significance are expected.
Offsite land use (refurbishment)	2	SMALL OR MODERATE. Impacts may be of moderate significance at plants in low population areas. See § 51.53(c)(3)(ii)(I).
Offsite land use (license renewal term)	2	SMALL, MODERATE, OR LARGE. Significant changes in land use may be associated with population and tax revenue changes resulting from license renewal. See § 51.53(c)(3)(ii)(I).
Public services, Transportation	2	SMALL, MODERATE, OR LARGE. Transportation impacts are generally expected to be of small significance. However, the increase in traffic associated with the additional workers and the local road and traffic control conditions may lead to impacts of moderate or large significance at some sites. See § 51.53(c)(3)(ii)(J).

Footnotes at end of table.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
Historic and archaeological resources	2	SMALL, MODERATE, OR LARGE. Generally, plant refurbishment and continued operation are expected to have no more than small adverse impacts on historic and archaeological resources. However, the National Historic Preservation Act requires the Federal agency to consult with the State Historic Preservation Officer to determine whether there are properties present that require protection. See § 51.53(c)(3)(ii)(K).
Aesthetic impacts (refurbishment)	1	SMALL. No significant impacts are expected during refurbishment.
Aesthetic impacts (license renewal term)	1	SMALL. No significant impacts are expected during the license renewal term.
Aesthetic impacts of transmission lines (license renewal term)	1	SMALL. No significant impacts are expected during the license renewal term.
Postulated Accidents		
Design basis accidents	1	SMALL. The NRC staff has concluded that the environmental impacts of design basis accidents are of small significance for all plants.
Severe accidents	2	SMALL. The probability weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to ground water, and societal and economic impacts from severe accidents are small for all plants. However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives. See § 51.53(c)(3)(ii)(L).
Uranium Fuel Cycle and Waste Management		
Offsite radiological impacts (individual effects from other than the disposal of spent fuel and high level waste)	1	SMALL. Off-site impacts of the uranium fuel cycle have been considered by the Commission in Table S-3 of this part. Based on information in the GEIS, impacts on individuals from radioactive gaseous and liquid releases including radon-222 and technetium-99 are small.

Footnotes at end of table.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
Offsite radiological impacts (collective effects)	1	The 100 year environmental dose commitment to the U.S. population from the fuel cycle, high level waste and spent fuel disposal is calculated to be about 14,800 person rem, or 12 cancer fatalities, for each additional 20 year power reactor operating term. Much of this, especially the contribution of radon releases from mines and tailing piles, consists of tiny doses summed over large populations. This same dose calculation can theoretically be extended to include many tiny doses over additional thousands of years as well as doses outside the U. S. The result of such a calculation would be thousands of cancer fatalities from the fuel cycle, but this result assumes that even tiny doses have some statistical adverse health effect which will not ever be mitigated (for example no cancer cure in the next thousand years), and that these does projection over thousands of years are meaningful. However these assumptions are questionable. In particular, science cannot rule out the possibility that there will be no cancer fatalities from these tiny doses. For perspective, the doses are very small fractions of regulatory limits, and even smaller fractions of natural background exposure to the same populations. Nevertheless, despite all the uncertainty, some judgement as to the regulatory NEPA implications of these matters should be made and it makes no sense to repeat the same judgement in every case. Even taking the uncertainties into account, the Commission concludes that these impacts are acceptable in that these impacts would not be sufficiently large to require the NEPA conclusion, for any plant, that the option of extended operation under 10 CFR Part 54 should be eliminated. Accordingly, while the Commission has not assigned a single level of significance for the collective effects of the fuel cycle, this issue is considered Category 1.

Footnotes at end of table.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
Offsite radiological impacts (spent fuel and high level waste disposal)	1	For the high level waste and spent fuel disposal component of the fuel cycle, there are no current regulatory limits for offsite releases of radionuclides for the current candidate repository site. However, if we assume that limits are developed along the lines of the 1995 National Academy of Sciences (NAS) report, "Technical Bases for Yucca Mountain Standards," and that in accordance with the Commission's Waste Confidence Decision, 10 CFR 51.23, a repository can and likely will be developed at some site which will comply with such limits, peak doses to virtually all individuals will be 100 millirem per year or less. However, while the Commission has reasonable confidence that these assumptions will prove correct, there is considerable uncertainty since the limits are yet to be developed, no repository application has been competed or reviewed, and uncertainty is inherent in the models used to evaluate possible pathways to the human environment. The NAS report indicated that 100 millirem per year should be considered as a starting point for limits for individual doses, but notes that some measure of consensus exists among national and international bodies that the limits should be a fraction of the 100 millirem per year. The lifetime individual risk from 100 millirem annual dose limit is about $3x10^{-3}$. Estimating cumulative doses to populations over thousands of years is more problematic. The likelihood and consequences of events that could seriously compromise the integrity of a deep geologic repository were evaluated by the Department of Energy in the "Final Environmental Impact Statement: Management of Commercially Generated Radioactive Waste," October 1980. The evaluation estimated the 70-year whole-body dose commitment to the maximum individual and to the regional population resulting from

Footnotes at end of table.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
		several modes of breaching a reference repository in the year of closure, after 1,000 years, after 100,000 years, and after 100,000,000 years. Subsequently, the NRC and other federal agencies have expended considerable effort to develop models for the design and for the licensing of a high level waste repository, especially for the candidate repository at Yucca Mountain. More meaningful estimates of doses to population may be possible in the future as more is understood about the performance of the proposed Yucca Mountain repository. Such estimates would involve very great uncertainty, especially with respect to cumulative population doses over thousands of years. The standard proposed by the NAS is a limit on maximum individual dose. The relationship of potential new regulatory requirements, based on the NAS report, and cumulative population impacts has not been determined, although the report articulates the view that protection of individuals will adequately protect the population for a repository at Yucca Mountain. However, EPA's generic repository standards in 40 CFR Part 191 generally provide an indication of the order of magnitude of cumulative risk to population that could result from the licensing of a Yucca Mountain repository, assuming the ultimate standards will be within the range of standards now under consideration. The standards in 40 CFR Part 191 protect the population by imposing "containment requirements" that limit the cumulative amount of radioactive material released over 10,000 years. The cumulative release limits are based on EPA's population impact goal of 1,000 premature cancer deaths world-wide for a 100,000 metric tonne (MTHM) repository. Nevertheless, despite all the uncertainty, some judgement as to the regulatory NEPA implications of these matters should be made and it makes no sense to repeat the same judgement in every case. Even taking the uncertainties into account, the Commission concludes that these impacts are acceptable in that these impacts would not be sufficiently large to require the NEPA conclusion, for any plant, that the option of extended operation under 10 CFR Part 54 should be eliminated. Accordingly, while the Commission has not assigned a single level of significance for the impacts of spent fuel and high level waste disposal, this issue is considered Category 1.

Footnotes at end of table.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
Nonradiological impacts of the uranium fuel cycle	1	SMALL. The nonradiological impacts of the uranium fuel cycle resulting from the renewal of an operating license for any plant are found to be small.
Low-level waste storage and disposal	1	SMALL. The comprehensive regulatory controls that are in place and the low public doses being achieved at reactors ensure that the radiological impacts to the environment will remain small during the term of a renewed license. The maximum additional on-site land that may be required for low-level waste storage during the term of a renewed license and associated impacts will be small. Nonradiological impacts on air and water will be negligible. The radiological and nonradiological environmental impacts of long-term disposal of low-level waste from any individual plant at licensed sites are small. In addition, the Commission concludes that there is reasonable assurance that sufficient low-level waste disposal capacity will be made available when needed for facilities to be decommissioned consistent with NRC decommissioning requirements.
Mixed waste storage and disposal	1	SMALL. The comprehensive regulatory controls and the facilities and procedures that are in place ensure proper handling and storage, as well as negligible doses and exposure to toxic materials for the public and the environment at all plants. License renewal will not increase the small, continuing risk to human health and the environment posed by mixed waste at all plants. The radiological and nonradiological environmental impacts of long-term disposal of mixed waste from any individual plant at licensed sites are small. In addition, the Commission concludes that there is reasonable assurance that sufficient mixed waste disposal capacity will be made available when needed for facilities to be decommissioned consistent with NRC decommissioning requirements.
On-site spent fuel	1	SMALL. The expected increase in the volume of spent fuel from an additional 20 years of operation can be safely accommodated on site with small environmental effects through dry or pool storage at all plants if a permanent repository or monitored retrievable storage is not available.

Footnotes at end of table.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
Nonradiological waste	1	SMALL. No changes to generating systems are anticipated for license renewal. Facilities and procedures are in place to ensure continued proper handling and disposal at all plants.
Transportation	2	Table S-4 of this Part contains an assessment of impact parameters to be used in evaluating transportation effects in each case. See § 51.53(c)(3)(ii)(M).

Footnotes at end of table.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
		Decommissioning
Radiation doses	1	SMALL. Doses to the public will be well below applicable regulatory standards regardless of which decommissioning method is used. Occupational doses would increase no more than 1 man-rem caused by buildup of long-lived radionuclides during the license renewal term.
Waste management	1	SMALL. Decommissioning at the end of a 20-year license renewal period would generate no more solid wastes than at the end of the current license term. No increase in the quantities of Class C or greater than Class C wastes would be expected.
Air quality	1	SMALL. Air quality impacts of decommissioning are expected to be negligible either at the end of the current operating term or at the end of the license renewal term.
Water quality	1	SMALL. The potential for significant water quality impacts from erosion or spills is no greater whether decommissioning occurs after a 20-year license renewal period or after the original 40-year operation period, and measures are readily available to avoid such impacts.
Ecological resources	1	SMALL. Decommissioning after either the initial operating period or after a 20-year license renewal period is not expected to have any direct ecological impacts.
Socioeconomic impacts	1	SMALL. Decommissioning would have some short-term socioeconomic impacts. The impacts would not be increased by delaying decommissioning until the end of a 20-year relicense period, but they might be decreased by population and economic growth.
		Environmental Justice
Environmental justice[6]	NA[4]	NONE. The need for and the content of an analysis of environmental justice will be addressed in plant-specific reviews.[6]

[1] Data supporting this table are contained in NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" (xxxx 1996).

Footnotes at end of table.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]

[2] The numerical entries in this column are based on the following category definitions:

Category 1: For the issue, the analysis reported in the Generic Environmental Impact Statement has shown:

(1) The environmental impacts associated with the issue have been determined to apply either to all plants or, for some issues, to plants having a specific type of cooling system or other specified plant or site characteristic;

(2) A single significance level (i.e., small, moderate, or large) has been assigned to the impacts (except for collective off site radiological impacts from the fuel cycle and from high level waste and spent fuel disposal); and

(3) Mitigation of adverse impacts associated with the issue has been considered in the analysis, and it has been determined that additional plant-specific mitigation measures are likely not to be sufficiently beneficial to warrant implementation.

The generic analysis of the issue may be adopted in each plant-specific review.

Category 2: For the issue, the analysis reported in the Generic Environmental Impact Statement has shown that one or more of the criteria of Category 1 can not be met, and therefore additional plant-specific review is required.

[3] The impact findings in this column are based on the definitions of three significance levels. Unless the significance level is identified as beneficial, the impact is adverse, or in the case of "small," may be negligible. The definitions of significance follow:

SMALL — For the issue, environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. For the purposes of assessing radiological impacts, the Commission has concluded that those impacts that do not exceed permissible levels in the Commission's

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]
		regulations are considered small as the term is used in this table.
	MODERATE	For the issue, environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
	LARGE	For the issue, environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

For issues where probability is a key consideration (i.e. accident consequences), probability was a factor in determining significance.

[4] NA (not applicable). The categorization and impact finding definitions do not apply to these issues.

[5] Scientific evidence about a chronic biological effect on humans from exposure to transmission line electric and magnetic fields is inconclusive. If the Commission finds that a consensus has been reached by appropriate Federal health agencies that there are adverse health effects, the Commission will require applicants to submit plant-specific reviews of these health effects. Until such time, applicants for license renewal are not required to submit information on this issue.

Table B-1.
Summary of findings on NEPA issues for license renewal of nuclear power plants[1]

Issue	Category[2]	Findings[3]

[6] Environmental Justice was not addressed in NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants," because guidance for implementing Executive Order 12898 issued on February 11, 1994, was not available prior to completion of NUREG-1437. This issue will be addressed in individual license renewal reviews.

Dated at Rockville, Maryland, this _____ day of _____ , 1996.

For the Nuclear Regulatory Commission.

_____
John C. Hoyle,
Secretary of the Commission.