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RULEMAKING ISSUE (Notation Vote)

September 3, 1996

SECY-96-190

FOR: The Commissioners
FROM: James M. Taylor, Executive Director for Operations
SUBJECT: FINAL RULEMAKING ON "ENVIRONMENTAL REVIEW FOR RENEWAL OF NUCLEAR POWER PLANT OPERATING LICENSES," 10 CFR PART 51

PURPOSE:

To inform the Commission of public comments received on the final rule notice, 10 CFR Part 51, "Environmental Review for Renewal of Nuclear Power Plant Operating Licenses" and the supporting final generic environmental impact statement, and to request Commission approval to publish in the Federal Register the enclosed notice amending the final rule with minor clarifying and conforming changes.

BACKGROUND:

On February 9, 1996 (SECY-96-035), the staff submitted a final rule notice, 10 CFR Part 51, "Environmental Review for Renewal of Nuclear Power Plant Operating Licenses" and the required supporting documents for Commission approval to publish and to forward to the U. S. Environmental Protection Agency (EPA) for its review. In a Staff Requirements Memorandum (SRM) dated April 17, 1996, the Commission instructed the staff to forward the interim final rule to EPA for a 45-day review period and to prepare and submit to the Commission a notice of the interim final rule allowing for a 30-day public comment period to specifically request comments on the issues of low-level waste storage and disposal impacts, the cumulative radiological effects from the fuel cycle, and the effects from the disposal of high-level waste and spent fuel. The notice of the interim final rule was submitted to the Commissioners by memorandum dated April 29, 1996. Commission approval to publish the interim final rule was provided in an SRM dated May 8, 1996. The interim final rule was published in the Federal Register on June 5, 1996 (61 FR 28467). In a supplemental notice published on July 18, 1996

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415-6263

NOTE: TO BE MADE PUBLICLY AVAILABLE WHEN
THE FINAL SRM IS MADE AVAILABLE

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(61 FR 37351), the Commission extended the comment period for these issues to August 5, 1996, and indicated that the final rule would become effective on September 5, 1996, absent notice from the Commission to the contrary.

DISCUSSION:

This paper reports on the public comments received on the interim final rule and forwards to the Commission for its approval the Federal Register notice that summarizes the public comments and provided staff responses. The notice also provides the full regulatory text of the final rule in order to add several Ground-water Use and Quality issues which the Federal Register inadvertently left out of Table B-1 as we transmitted it in the June 5, 1996 notice (see, 61 FR 29278, July 29, 1996); to make minor conforming changes to reflect recent amendments to 10 CFR Part 51 at §§ 51.53 and 51.95 effected by a separate rulemaking ("Decommissioning of Nuclear Power Reactors," July 29, 1996 (61 FR 39278)); and to make two minor clarifications in rule language.

Public Comments

In response to the Federal Register notice for the final rule published on June 5, 1996 (61 FR 28467), 11 organizations and 1 private citizen submitted written comments. The 11 organizations included the U. S. Environmental Protection Agency; the States of Maryland, Massachusetts, and Vermont; and the Nuclear Energy Institute and 6 licensees. Commenters expressed concerns about specific aspects of the rule and several commenters referred to material in NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants," May 1996 (GEIS), which they believe to be inaccurate or ambiguous. With the exception of one State, the commenters expressed that the rule should be revised to address their concerns. The seven commenters from the nuclear power industry stated that their concerns should be addressed by supplemental rulemaking and should not delay the effective date of the rule as published in 61 FR 28467. Although it was not explicitly stated, the staff assumes that EPA, two States, and the private individual prefer that their concerns be addressed by revising the final rule and final GEIS now rather than by supplemental rulemaking.

The States continue to express concern over the prospect of long-term storage of high-level waste (HLW) at reactor sites. One State also expressed concern over the prospect of long-term storage of low-level waste (LLW) at reactor sites. One State supports the provisions in the rule for the waste issues. Two States believe that site-specific reviews of HLW storage and disposal should be required in a license renewal review and one of these States believes a site-specific review should be required of LLW storage and disposal. One of these States would have the Commission condition renewal of an operating license on the resolution of the radioactive waste disposal issues.

Six industry organizations specifically commented on the treatment of the LLW and HLW issues in the June 5, 1996 notice (61 FR 28467) and in the GEIS.

Except for the treatment of the environmental impacts of transportation of radiological material to and from the plant, the industry commenters agreed with the Commission's findings on the waste issues. Industry believes that transportation can and should be addressed generically within the rule and site-specific reviews should not be required. As part of its efforts to develop a Regulatory Guide for this rule, the staff will consider whether any additional amendments to the rule are warranted for this issue.

Industry commenters requested that the Commission consider reaching a generic finding and Category 1 determination (site-specific review not required) for the issues of Severe Accidents, Electromagnetic Fields (Chronic Effects), and Environmental Justice. The Commission has already stated in the June 5, 1996 notice, that upon completion of its Individual Plant Examination program and its Individual Plant Examination for Externally Initiated Events 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. Also, in the June 5, 1996 notice, the Commission stated that after receipt of guidance on the treatment of Environmental Justice from the Council on Environmental Quality the Commission requirements will be reviewed and may be revised. With regard to the issue of Electromagnetic Fields (Chronic Effects), the staff continues to believe that the provision in the final rule are appropriate. This provision places the responsibility on the Commission, not on the applicant for monitoring whether a consensus that there are adverse health effects has been reached by appropriate Federal health agencies.

EPA found that the final GEIS provides a significant amount of additional data and analyses that satisfies many of its technical concerns. Also, EPA endorsed the provisions for public involvement and the specification of alternatives in the final rule. EPA continues to have concern with the Commission's definition of purpose and need. In addition, EPA has concerns with the level of consideration of environmental justice and a number of radiation issues. With respect to the Commission's definition of purpose and need, this matter was deliberated with extensive public input during the course of this rulemaking. The staff believes that the explanation of the Commission's position on this matter in the June 5, 1996, notice is appropriate and sound. With respect to the level of consideration of environmental justice, the staff would point out that the Commission is in the process of developing guidance and that at this time it should be assumed that such guidance, when available, will be adequate. EPA raises seven concerns with the treatment of radiation issues in the final rule and the final GEIS. Several of these concerns call for clarification of statements in the final GEIS or rule. The enclosed Federal Register notice provides such clarifications. In one comment EPA disagrees with the Commission's definition of "small" radiological impacts ("...those impacts that do not exceed permissible levels in the Commission's regulations...") and suggests that small should be defined as not exceeding the upper bound risk limits of $10E-6$ to $10E-4$, established under the Comprehensive Environmental Response, Compensation and Liability Act. The response in the enclosed notice explains the reasons why the Commission believes that it is reasonable to define small

with respect to radiological impacts as being within the Commission's regulatory limits. In another comment, EPA took issue with the short time frame used in the discussion of risk that might be associated with the disposal of spent-fuel in the candidate high-level waste repository at Yucca Mountain. EPA suggested that a timeframe such as 10,000 years would be more appropriate. The response in the enclosed notice explains that high-level waste repository impacts for the purpose of a license renewal review are discussed within the framework established in 10 CFR 51.51 "Uranium fuel cycle environmental data"--Table S-3 and thus, does not require the same level of analysis that will be required for the licensing of a repository.

COORDINATION:

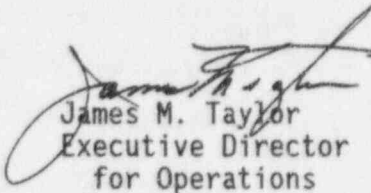
The Office of the General Counsel has no legal objection to this paper and the enclosed final rule.

RECOMMENDATION:

That the Commission:

1. Approve the enclosed Notice of the Final Rule for publication in the Federal Register to become effective 30 days after the date of publication.
2. Note
 - a. That this is a direct final rule amending the final rule published June 5, 1996 (61 FR 28467).
 - b. All discussions and conclusions made in the June 5, 1996, notice (61 FR 28467), remain in effect.

- c. The staff will develop a plan and schedule for the development of a Regulatory Guide and Environmental Standard Review Plan for implementation of this rule. The plan will provide for consideration of whether to amend this rule with respect to the provisions of 10 CFR 51.52 and provisions for addressing environmental justice.


James M. Taylor
Executive Director
for Operations

Enclosure: As stated

Commissioners' comments or consent should be provided directly to the Office of the Secretary by COB Wednesday, September 18, 1996.

Commission Staff Office comments, if any, should be submitted to the Commissioners NLT September 11, 1996, with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

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FEDERAL REGISTER NOTICE

[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; Effective date.

SUMMARY: The Nuclear Regulatory Commission is amending its regulations on the environmental review of applications to renew the operating licenses of nuclear power plants to make minor clarifying and conforming changes and add language inadvertently omitted from Table B-1 of the rulemaking published June 5, 1996 (61 FR 28467). This final rule also presents an analysis of the comments received and the staff responses to the comments requested in the final rule published June 5, 1996. After reviewing the comments received, the NRC has determined that no substantive changes to the final rule is warranted.

DATES: This final rule shall be effective on [30 days after publication].

ADDRESSES: Copies of comments received and all documents cited in the supplementary information section of 61 FR 28467 may be examined at the NRC Public Document Room, 2120 L Street NW, (Lower Level) Washington, DC, between the hours of 2:45 am and 4:15 pm on Federal workdays.

FOR FURTHER INFORMATION CONTACT: Donald P. Cleary, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; telephone: 301-415-6263; e-mail DPC@nrc.gov.

SUPPLEMENTARY INFORMATION:

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 a nuclear power plant operating license for up to an additional 20 years. The final rule containing these amendments was published in the Federal Register on June 5, 1996 (61 FR 28467). The amendments are based on the analyses reported in NUREG-1437, "Generic Environmental Impact Statement (GEIS) for License Renewal of Nuclear Plants" (May 1996). At several stages in the development of the rule the Commission sought public comment by means of notices in the Federal Register and public workshops. The history of this rulemaking is summarized in the June 5, 1996 notice (61 FR 28469). Prior to the final rule becoming effective, the Commission believed it appropriate to seek comments on the treatment of low-level waste storage and disposal impacts, the cumulative radiological effects from the uranium fuel cycle, and the effects from the disposal of high-level waste and spent fuel. In a supplemental notice published on July 18, 1996 (61 FR 37351), the Commission extended the comment period for these issues to August 5, 1996, and indicated that the final rule would become effective on September 5, 1996, absent notice from the Commission to the contrary. The

Commission has reviewed the comments submitted and finds no need to amend the substantive provisions of the rule.

This direct final rule amends the June 5, 1996 rule with minor nonsubstantive changes. The changes are: addition of five Ground-water Use and Quality issues inadvertently left out of Table B-1 in the June 5, 1996 notice (see, 61 FR 29278, July 29, 1996); minor conforming changes to reflect recent amendments to §§ 51.53 and 51.95 effected by a separate rulemaking ("Decommissioning of Nuclear Power Reactors," July 29, 1996 (61 FR 39278)); substitution of one sentence under Findings for the issue Offsite radiological impacts (spent fuel and high-level waste disposal) in Table B-1, in order to more accurately represent a U. S. Environmental Protection Agency (EPA) regulatory position; and addition of a sentence to 10 CFR 51.53(c)(3)(ii)(M), in order to clarify the information on the environmental effect of transportation of fuel and waste to and from a nuclear power plant that is to be submitted with a license renewal application.

II. Analysis of Public Comments

A. Commenters.

In response to the Federal Register notice for the final rule published on June 5, 1996 (61 FR 28467), 11 organizations and 1 private citizen submitted written comments. The 11 organizations included the EPA; the States of Maryland, Massachusetts, and Vermont; the Nuclear Energy Institute, and 6 licensees. Commenters expressed concerns about specific aspects of the rule and several commenters referred to material in NUREG-1437 which they believe

to be inaccurate or ambiguous. Other than one State, the commenters expressed that the rule should be revised to address their concerns. The seven commenters from the nuclear power industry stated that their concerns should be addressed by supplemental rulemaking and should not delay the effective date of the rule as published in 61 FR 28467. The Commission assumes that EPA, two States, and the private individual intend for their concerns to be addressed by revising the final rule and final GEIS now rather than by supplemental rulemaking. These specific concerns and how and when they should be resolved are addressed below.

B. Radioactive Waste Storage and Disposal, and Cumulative Radiological Effects of the Uranium Fuel Cycle.

Comment. The two commenting States expressed concern over the prospect of long-term storage of high-level waste (HLW) at reactor sites. One State also expressed concern over the prospect of long-term storage of low-level waste (LLW) at reactor sites. This State believes that "the Commission should establish a policy which would condition license renewal to a resolution of radioactive waste disposal issues." One State believes that provisions in NRC's regulations for addressing significant new information and the 10-year cycle for reviewing the continued appropriateness of the conclusions codified by the rule are not adequate with respect to the issues of on-site storage and disposal of HLW; and, therefore, site-specific environmental review should be required for these issues, i.e., these issues should be designated Category 2. A third State believes that a Category 1 designation is appropriate for these issues, i.e., findings for the issue codified in the rule may be adopted in

site-specific license renewal reviews, and supports the provision in the rule for periodic evaluation of these issues.

Response. As stated at 61 FR 28477, the Commission acknowledges that there is uncertainty in the schedule of availability of disposal facilities for LLW and HLW. The Commission understands the continuing concern of the States and of the public over the prospects for timely development of waste disposal facilities. The uncertainty in the schedule of availability of disposal facilities is especially of concern because of the waste currently being generated during the initial licensing term of power reactors. The Commission, however, continues to believe that there is sufficient understanding of and experience with the storage of LLW and HLW to conclude that the waste generated at any plant as a result of license renewal can be stored safely and without significant environmental impacts prior to permanent disposal. The Commission believes that conditioning individual license renewal decisions on resolution of radioactive waste disposal issues is not warranted because the Commission has already made a generic determination, codified in 10 CFR 51.23, that spent fuel generated at any reactor can be stored safely and without significant environmental impacts for at least 30 years beyond a license renewal term and that there will be a repository available within the first quarter of the twenty-first century. The waste confidence decision is discussed in Chapter 6 of NUREG-1437, "Generic Environmental Impact Statement for License Renewal for Nuclear Plants," May 1996. The Commission similarly believes that enough is known regarding the effects of permanent disposal to reach the generic conclusion in the rule. The rule is not based on the assumption that Yucca Mountain will be licensed. Also from a regulatory policy perspective, the Commission disagrees with the

view of one state that each renewal applicant should come forward with an analysis of the HLW storage and disposal environmental effects; this is a national problem of essentially the same degree of complexity and uncertainty for every renewal application and it would not be useful to have a repetitive reconsideration of the matter.

The Commission further believes that the provisions in the present rule and elsewhere in the Commissions regulations adequately provide for the introduction and consideration of new significant information in license renewal reviews, and that the 10 year review cycle for the rule and the GEIS adequately provides for Commission reassessment of the status of LLW and HLW disposal programs. The Commission recognizes that the possibility of significant unexpected events remains open. Consequently, the Commission will review its conclusions on these waste findings should significant and pertinent unexpected events occur (see also, 49 FR 34658 (August 31, 1984)). In view of the Commission's favorable conclusions regarding prospects for safe and environmentally acceptable waste disposal, it sees no need for conditioning licenses as recommended. The Category 1 designations for the three issues low-level waste storage and disposal, offsite radiological impacts (spent fuel and high-level waste disposal), and on-site spent fuel in the final rule has not been changed in response to these comments.

Comment. Six industry organizations specifically commented on the treatment of the LLW and HLW issues in 61 FR 28467 and in the GEIS. Except for the treatment of the environmental impacts of transportation of radiological material to and from the plant, the industry commenters agree with the Commissions findings on waste issues. Transportation (radiological

and nonradiological environmental impacts) is designated Category 2 in the final rule. This designation requires some additional review of the environmental impacts of transportation.

The industry commenters argue that the requirements for the review of transportation impacts for license renewal described in the final rule are unclear, and that there are good reasons to change the transportation issue from a Category 2 to a Category 1 designation. The requirements for the review of transportation issues in the final rule were found by the commenters to be unclear with respect to (1) the use and legal status of 10 CFR 51.52, Table S-4, in the plant-specific license renewal review; (2) the conditions that must be met before an applicant may adopt Table S-4; and (3) the extent to which the "generic" effects of transporting spent fuel to a high-level waste repository should be considered in a plant-specific license renewal review. In addition, several commenters suggested that DOE should have the responsibility of considering the cumulative environmental impacts from transportation.

Response. The Commission does not believe that changes to the rule in response to industry comments are warranted at this time. However, in order to clarify the rule's requirements, the following guidance is provided on the issue of transportation impacts. As a result of this rulemaking, 10 CFR 51.53(c)(3)(ii)(M) requires applicants to review the environmental effects of transportation in accordance with § 51.52 (Table S-4) and to discuss the generic and cumulative impacts associated with transportation infrastructure in the vicinity of a high-level waste repository site. The candidate site at Yucca Mountain should be used for the purpose of impact analysis as long as that site is under consideration for licensing. The amendments to 10 CFR

Part 51 in this rulemaking do not alter the existing provisions of § 51.52.

If an applicant's reactor meets all the conditions in § 51.52(a) the applicant may use the environmental impacts of transportation fuel and waste to and from the reactor set forth in Summary Table S-4 to characterize the transportation impacts from the renewal of its license. However, because Table S-4 does not take into account the generic and cumulative (including synergistic) impacts of transportation infrastructure construction and operation in the vicinity of the Yucca Mountain repository site, such information would have to be provided by these applicants.

For reactors not meeting the conditions of paragraph § 51.52(a), the applicant must provide a full description and detailed analysis of such environmental effects associated with transportation in accordance with § 51.52(b). Industry commenters pointed out that the conditions in paragraph (a) are not likely to be satisfied by many plants now using higher burn-up fuel. In such cases, applicants may incorporate in their analysis the discussion presented in the GEIS in Section 6.2.3 "Sensitivity to Recent Changes in the Fuel Cycle," and Section 6.3 "Transportation." This category of applicants would also have to consider the generic and cumulative impacts of transportation infrastructure construction and operation in the vicinity of the Yucca Mountain repository site. These impacts may be attributed to an individual plant on a reactor-year basis.

As part of its efforts to develop regulatory guidance for this rule, the Commission will consider whether further changes to the rule are desirable to generically address: 1) the issue of cumulative transportation impacts and 2) the implications that the use of higher burn-up fuel have for the conclusions in Table S-4. After consideration of these issues, the Commission

will determine whether the issue of transportation impacts should be changed to Category 1.

As to the NRC's duty to consider the cumulative transportation impacts of license renewal, the Commission continues to believe that such analysis is appropriate. The fact that DOE rather than an applicant will have title to spent-fuel and high-level waste when it is transported to a repository and that ultimately DOE must consider the environmental impacts of transportation does not relieve the Commission of the responsibility under the National Environmental Policy Act to consider the impacts of transportation in its environmental review for renewal of an operating license.

Finally, regarding the attribution of transportation impacts between the initial operating license and the renewed license, the allocation of environmental data in § 51.51 and environmental impacts in § 51.52 on the bases of a reference reactor year sets the precedence for allocating generic (common) impacts.

Comment. EPA states that the discussion of the radiological impacts of the uranium fuel cycle (at 61 FR 28478) requires clarification regarding the collective effects, over time, on human populations.

Response. The Commission believes that the discussion adequately summarizes the potential collective health impacts of the uranium fuel cycle. The following is provided to clarify the specific elements of that discussion. First, an estimate is provided of the 100 year dose commitment to the U. S. population and the estimated cancer fatalities from the uranium fuel cycle that are attributable to each 20-year license renewal. It is then explained that much of the dose to individuals is "tiny" and is attributed to radon

releases from mines and tailing piles. Second, it is explained that the dose calculation could be extended to cover populations outside of the U. S. over thousands of years, and that such a calculation would estimate thousands of cancer fatalities. Third, the uncertainty that would be involved in this computation and the conservative nature of the estimates of fatalities are discussed. Views of the scientific community about the possible overestimation of fatalities resulting from the assumptions used are developed in Appendix E, Section E.4.1, of the GEIS. Finally, the discussion points out that no standards exist that can be used to reach a conclusion as to the significance of the magnitude of the collective radiological health effects.

Comment. EPA maintains that natural background radiation should not be used comparatively to judge the significance of additional doses of radiation.

Response. The statement referred to by EPA (at 61 FR 28478), is intended to provide perspective only on the magnitude of the additional dose, not on its significance.

Comment. EPA believes that the GEIS is unclear as to whether occupational doses are measured as the dose received by the average worker or the maximally exposed worker. The NRC should clarify what significance these two distinct measures have with respect to the NRC's regulatory regime for reactor licensing.

Response. Occupational dose limits and the requirement to achieve exposures which are as low as reasonably achievable (ALARA) are codified in the Commission's regulations in 10 CFR Part 20. The dose limits and measured doses correspond to the individual. However, the overall effectiveness of the

licensee's ALARA programs are reflected by the average doses received by the population of workers. A detailed discussion of the Commission's radiation protection limits and protection measures is provided in Appendix E of the GEIS. These regulations apply to license renewal activities. The estimates in the GEIS of occupational doses due to license renewal assume continued compliance with 10 CFR Part 20, including both the dose limits and the ALARA requirement.

Comment. EPA disagrees with the Commission's definition of "small" relative to radiological impacts. The Commission's definition is, "For the purpose 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." EPA points out that the Commission's regulations permit an upper limit that would exceed the range of $10E-6$ to $10E-4$, established under the Comprehensive Environmental Response, Compensation and Liability Act, for negligibly small lifetime risk. EPA believes that risks falling above this range should not be designated as small or insignificant.

Response. The definition of "small" used for assessing radiological impacts in the GEIS is not synonymous with "negligibly small," which implies that an impact is so insignificant as to be unworthy of consideration. The Commission promotes licensee programs to bring doses below the regulatory limits to "as low as reasonably achievable" (ALARA) through its regulations, 10 CFR 50.36(a), Appendix I to 10 CFR Part 50, and provisions in 10 CFR Part 20. Because ALARA programs continue to be effective, actual doses are

far below the regulatory limits, limits that represent a small risk. As the Commission's dose limits are based on radiation protection standards established by interagency committees and reflects international scientific consensus on the adequacy of protection standards, the Commission chooses to define radiological risk resulting from these standards as being "small."

Comment. EPA takes issue with the Commission's assumptions, in Section 6.2.2.2 of the GEIS, about regulatory limits for off-site releases of radionuclides for the candidate repository at Yucca Mountain. EPA stated that the Commission should not presume that EPA will adopt the National Academy of Science recommendation regarding a 100 millirem annual dose limit. Further, EPA believes that the GEIS should assume a smaller dose limit as a more conservative bounding estimate, consistent with the stated objective of Table S-3 to represent the worst case or bounding estimate of the potential release from the uranium fuel cycle [GEIS page 6-1].

Response. The Commission does not assume that EPA will adopt a 100 millirem annual dose limit. The discussion in Section 6.2.2.2 is clear that this limit is recommended by the Academy as a starting point for consideration, and that there is some measure of consensus among national and international bodies that the limits should be a fraction of the 100 mrem/year. If it is expected that the limit ultimately to be adopted will be lower than 100 mrem/year, then 100 mrem/year provides a bounding or "worst case" estimate, which is what EPA suggests.

Comment. EPA states: "The NRC has mis-stated the Agency's expectations regarding the performance of a high-level waste repository, and in doing so

has used an inappropriate benchmark for its discussion of acceptable doses to the general public from the disposal of reactor fuel. Table B-1...states that EPA's cumulative release limits (from 40 CFR Part 191) are based on a population impact goal of 1,000 premature cancer deaths in the first 10,000 years after closure of a repository. The table mistakenly equates EPA's standard for releases from a high-level waste repository--an extreme upper limit that would result in 1,000 premature cancer deaths--with EPA's goal or expectation for the performance of such repositories. EPA stated in the promulgation of its high-level waste regulation that a repository for 100,000 metric tonnes of reactor fuel would cause between 10 and 100 such deaths, on the assumption that the repository complies with the NRC's enforceable requirements for engineered barriers found at 10 CFR Part 60. The Commission should not use 1,000 fatal cancers as a benchmark for repository performance and instead should consider the Agency's stated expectation that a well-constructed, well-sited repository should out-perform this level by ten or one-hundred-fold. See 58 Fed. Reg. 38071. The same discussion appears in Section 6.2.2.2 of the GEIS on page 6-20 and should also be corrected there."

Response. The Commission agrees that referring to 1,000 premature cancer deaths as an EPA population "impact goal" is misleading. Until final repository release standards are promulgated and health impact estimates are available the Commission will continue to use 1,000 premature cancer deaths in the first 10,000 years after closure of a repository as an upper bound estimate of cumulative health effects. The following sentence has been substituted in the rule for the one with which EPA disagrees: "Repository performance standards that will be required by EPA are expected to result in releases and associated health consequences in the range between 10 and 100

premature cancer deaths with an upper limit of 1,000 premature cancer deaths world-wide for a 100,000 metric tonne (MTHM) repository."

Comment. EPA states: "The NRC has not adequately justified certain assumptions regarding its analysis of risks from the disposal of spent nuclear (reactor) fuel in the high-level waste repository at Yucca Mountain. The NRC asserts that analyses in the GEIS of health effects from disposal of reactor fuel need not extend beyond 1,000 years, though NRC's own regulations for high-level waste disposal, found at 10 CFR Part 60, contain explicit numerical requirements on releases occurring after the first 1,000 years. An analysis extending over a longer period of time would be more appropriate, such as for 10,000 years as required in EPA's high-level waste standard applicable to sites other than Yucca Mountain."

Response. This comment refers to an NRC staff response (found at NUREG-1529, page C7-3) to a comment made by an EPA participant in the NRC Public Workshop to Discuss License Renewal, held in Arlington, Virginia, November 4 and 5, 1991 (Session 4, page 26). The EPA participant pointed out that in the discussion of the uranium fuel cycle in the draft GEIS, NRC provided estimates of population dose commitments from open-pit uranium mines and stabilized tailings piles for 100, 500 and 1,000 years, but didn't provide long-term estimates for other long-lived materials. The commenter went on to point out that in the case of the high-level waste repository these calculations are carried out for 10,000 years, although in his view a calculation of impact should be carried until there is no more impact. The staff response to this comment is intended to point out that the likely radiological impacts attributable to any one nuclear power plant's HLW generated as a result of

license renewal are uncertain and are unlikely to be significantly altered by consideration of the impacts that may be attributable to the period from 1,000 to 10,000 years. The basis for the evaluation of the environmental impact of the uranium fuel cycle for the renewal of an operating license is 10 CFR 51.51 - Table S-3, as supplemented with an evaluation of the contribution of Radon-222 and Technetium-99 to the environmental impact of the fuel cycle. The environmental data in Table S-3 and discussion of associated environmental impacts is expressed on the basis of a reference reactor year of operation. Discussion of fuel cycle impacts has been further supplemented in the final GEIS with available information on the status of regulatory requirements and studies on the possible performance of the candidate high-level waste repository at Yucca Mountain.

C. Severe Accident Mitigation Design Alternatives.

Comment. Three industry commenters disagreed with the designation of severe accidents as Category 2 in the final rule and the requirement that severe accident mitigation design alternatives (SAMDAs) must be addressed by the applicant and staff if SAMDAs had not previously been addressed in a staff environmental document for the plant. They noted that efforts to analyze severe accident vulnerabilities and the opportunities to mitigate the vulnerabilities will be completed for all plants in the near future. These analyses will provide the bases for a generic finding on SAMDAs for all plants, including the designation of Category 1 for severe accidents. One commenter proposed that a generic Category 1 finding could be made that consideration of SAMDAs is not required for any plant that has a completed

Individual Plant Examination (IPE) and Individual Plant Examination of External Events (IPEEE).

Response. It is stated at 61 FR 28481 that upon completion of its IPE/IPEEE program, the Commission may review the issue of severe accident mitigation for license renewal and consider, by separate rulemaking, reclassifying severe accidents as a Category 1 issue. Completion of an IPE and IPEEE in itself is not sufficient to fulfill the Commission's responsibility under the National Environmental Policy Act (NEPA). SAMDA alternatives must be addressed within an Environmental Impact Statement (EIS), or supplement to an EIS, or an Environmental Assessment. The Commission believes that this can be most efficiently accomplished generically through a supplement to the GEIS and rule amendment based on Commission review of all IPEs and IPEEEs. Prior to successful completion of such a rulemaking an applicant will have to submit a SAMDA alternatives analysis, based on its IPE and IPEEE, in its environmental report. Then the Commission will review that analysis in a supplemental EIS for the plant.

D. Electromagnetic Fields (Chronic Effects).

Comment. Four industry commenters disagreed with the treatment of chronic health effects of transmission line electromagnetic fields. The rule contains the finding that the magnitude of effects is uncertain. No finding is made in the rule as to whether this issue is a Category 1 or Category 2. The commenters note that no submittal is required of an applicant for this issue until such time as the Commission finds that a consensus has been reached by the appropriate Federal health agencies that there are adverse

health effects. The commenters believe that the number of scientific studies performed over a long period of time which could find no harmful effects is adequate disclosure under the NEPA to designate this issue Category 1. It is suggested that an alternative to a Category 1 designation is rewording Footnote 5 to Table B-1 in the rule to state in a more positive manner that there is no scientific evidence of chronic biological effects on humans and that this issue will not be admitted as a contention in any hearing on a renewal application. One commenter believes that this issue is not related to refurbishment activities and thus should not be addressed in the context of license renewal.

Response. The Commission is not inclined at this time to change the rule relative to the treatment of the chronic human health effects of transmission line electromagnetic fields. The Commission recognizes that some, possibly many, experts would believe that the scientific evidence could support a Category 1 determination. However, the Commission believes that a more conservative position on this issue is appropriate. With respect to concern that nonproductive litigation of this issue will take place in license renewal hearings, it should be noted that because of the intensive scrutiny given to this issue within the scientific community, any contention will have to meet scientific standards for admission.

E. Environmental Justice.

Comment. Comments about the treatment of environmental justice in the rule were offered by EPA and two licensees. EPA stated that as the Commission further defines its environmental justice requirements it should consider the

draft guidance issued by the Council on Environmental Quality (CEQ) on May 24, 1996, and the draft guidance issued by EPA on July 12, 1996. The licensees believe that the rule should include provisions for the treatment of environmental justice that take into consideration that most environmental impacts of relicensing nuclear plants have been found to be small and whether there is any benefit in conducting an environmental justice review for an already sited facility.

Response. The Commission is aware of the CEQ and EPA draft guidance on the treatment of environmental justice in NEPA reviews. This guidance is being considered as the Commission proceeds with developing its own requirements for the treatment of environmental justice in NEPA reviews. As these requirements are developed, the Commission will consider whether it is appropriate to take a generic rather than a site-specific approach to this issue for license renewal reviews.

F. Supplemental Site-Specific Environmental Impact Statement Versus Environmental Assessment.

Comment. A licensee disagrees with the Commission's decision that a supplemental EIS will be prepared for license renewal reviews rather than a supplemental environmental assessment (EA) as proposed in the proposed rule. The licensee believes that environmental reviews will show that there will be no significant environmental impact for a number of license renewal applicants, and therefore preparation of an environmental assessment should be allowed under the final rule.

Response. Several considerations led to the Commission's decision to require a supplemental EIS in license renewal reviews. The proposed rule and supporting GEIS would have included a preliminary conclusion of a favorable cost-benefit balance. The function of an EA would have been to consider the impacts associated with a limited set of environmental issues and whether these impacts would overturn the favorable preliminary cost-benefit finding in the GEIS and codified in the rule. Because there was a possibility that the impacts for the limited set of environmental issues would be found to be nonexistent or insignificant (no significant impacts), use of a EA was provided for in the proposed rule. In addition, a finding of no significant impact and the supporting EA may be issued in draft for comment at the discretion of the appropriate NRC staff director. The proposed rule was challenged with respect to preliminary cost-benefit findings and procedural hurdles to public input to the license renewal review. To resolve these concerns, the Commission modified the rule to eliminate the preliminary license renewal finding and to make that finding only after consideration of all impacts within the plant-specific review. The Commission believes that the sum of all the individual impacts that are to be considered in the decision whether to renew a nuclear power plant operating license for an additional 20 years, especially given the controversy over various aspects of nuclear power, exceeds the Commission's threshold for a finding of no significant impact. This and the desire to ensure public access to the license renewal review process led to the requirement of a supplemental EIS for license renewal.

G. Purpose and Need for the Proposed Action.

Comment. EPA questions the definition of the "proposed action" within the context of the discussion of purpose and need at 61 FR 28472.

Response. The definition of "purpose and need" is to be applied to the "proposed action" of renewal of a nuclear power plant operating license. It does not refer to and should not be confused with the purpose of the GEIS, which is given in the GEIS, Section 1.1 Purpose of the GEIS.

H. Alternatives.

Comment. A individual believes that the rule appears to contradict the Limerick Ecology Action decision, 869 F.2d 719 (3rd Cir. 1989). The commenter states that this decision "...requires the environmental review to look at non-nuclear design alternatives in context of severe accidents including non-nuclear alternatives." The commenter proceeds to express concern that the analysis of alternatives consider "efficiency and conservation" and that sites considered for alternatives not be limited geographically because of the ability to wheel power over long distances. Finally, the individual objects to eliminating utility economics from the environmental review because "The real world reason to extend an operating license is that of utility economics."

Response. The Limerick decision was concerned with the consideration of design mitigation alternatives specifically for the Limerick plant, not with "non-nuclear design alternatives." With respect to the commenters concerns

about the treatment of alternatives to license renewal, the Commission believes that the final GEIS and rule adequately accommodate these concerns. The consideration of alternative energy sources in individual license renewal reviews will consider those alternatives that are reasonable for the region, including power purchases from outside the applicants service area. Also, in assessing the environmental impacts of new generating capacity it will not necessarily be assumed that the capacity would be constructed on the site under review. Finally, consideration of the economic merits of renewing a plant operating license is eliminated only from the Commission's decision whether to renew. The decision about the economic merits of continued operation of a nuclear power plant will be made by the owners and the State regulators.

III. Procedural Background

Because this rule makes only minor clarifying and conforming changes and adds language inadvertently omitted from Table B-1 of the rulemaking published June 5, 1996, and because public comments were solicited on that rulemaking the NRC is approving this rule without seeking public comments on proposed amendments.

IV. No Change in Supplemental Information

No change to the Supplemental Information that was provided in 61 FR 28467, July 5, 1996, is required. The discussions and conclusions made in VII. Finding of No Significant Environmental Impact: Availability; VIII.

Paperwork Reduction Act Statement: IX. Regulatory Analysis; X. Regulatory Flexibility Act Certification; XI. Small Business Regulatory Enforcement Fairness Act; and XII. Backfit Analysis are unchanged.

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} ft³/year (9×10^{10} m³/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} ft³/year (9×10^{10} m³/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. The review of impacts shall also discuss the generic and cumulative impacts associated with transportation infrastructure in the vicinity of a high-level waste repository site. The candidate site at Yucca Mountain should be used for the purpose of impact analysis as long as that site is under consideration for licensing.

(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 decommissioning activities for a production or utilization facility either for unrestricted use or based on continuing use restrictions applicable to the site; and each applicant for a license amendment approving a license termination plan or decommissioning plan under § 50.82 of this chapter either for unrestricted use or based on continuing use restrictions applicable to the site; and each applicant for a license or license amendment to store spent fuel at a nuclear power reactor after

expiration of the operating license for the nuclear power reactor shall submit with its application the number of copies, as specified in § 51.55, of a separate document, entitled "Supplement to Applicant's Environmental Report--Post Operating License Stage," which will update "Applicant's Environmental Report--Operating License 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 only address the environmental impact of spent fuel storage for the term of the license applied for. The "Supplement to Applicant's Environmental Report--Post Operating License Stage" may incorporate by reference any information contained in "Applicants Environmental Report--Construction Permit Stage.

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.

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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 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

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.

⁴The 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.

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 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" (May 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 (i) 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, (ii) information developed for those open Category 2 issues applicable to the plant in accordance with § 51.53(c)(3)(ii), and (ii) 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 the amendment of an operating license authorizing decommissioning activities at a production or utilization facility covered by § 51.20, either for unrestricted use or based on continuing use restrictions applicable to the site, or with the issuance, amendment or renewal of a license to store spent fuel at a nuclear power reactor after expiration of the operating license for the nuclear power reactor, the NRC staff will prepare a supplemental environmental impact statement for the post operating license stage or an environmental assessment, as appropriate, which will update the prior environmental review. The supplement or assessment may incorporate by reference any information contained in the final environmental impact statement- operating license stage, or in the records of decision prepared in connection with the construction permit or the operating license for that facility. The supplement will include a request for comments as provided in § 51.73. Unless other wise 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 post operating 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 either an operating license or construction permit as of June 30, 1995. 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 plants¹

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.

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
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.
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.

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
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.
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.

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
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.

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
<p style="text-align: center;">Aquatic Ecology (for plants with once-through and cooling pond heat dissipation systems)</p>		
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).
<p style="text-align: center;">Aquatic Ecology (for plants with cooling-tower-based heat dissipation systems)</p>		
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.

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
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		
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).

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
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.
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).

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

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.

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
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)		
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).

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
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.
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.

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
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 general conclusion on human health impact 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.

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
Socioeconomics		
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).

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
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).
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.

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
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.
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

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
Offsite radiological impacts (spent fuel and high level waste disposal)	1	<p>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 doses 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.</p> <p>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.</p> <p>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</p>

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
		<p>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 completed 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 3×10^{-3}.</p> <p>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</p>

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
		<p>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. Reporting performance standards that will be required by EPA are expected to result in releases and associated health consequences in the range between 10 and</p>

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
Nonradiological impacts of the uranium fuel cycle	1	bound 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.
		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.

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
Low-level waste storage and disposal	1	<p>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.</p> <p>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.</p>

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
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.
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).

Decommissioning

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
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.

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
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" (May 1996).

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:

Table B-1. Summary of findings on NEPA issues for license renewal of nuclear power plants¹

Issue	Category ²	Findings ³
<u>SMALL</u>		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 as the term is used in this table.
<u>MODERATE</u>		For the issue, environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
<u>LARGE</u>		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 plants¹

Issue	Category ²	Findings ³
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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.