PROPOSED RULE PR 51 (56 FR)

ENCLOSURE 3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

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OFFICE OF ENFORCEMENT

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Mr. Samuel Chilk
Secretary of the Commission
Nuclear Regulatory Commission
Attention: Docketing and Service Branch
Washington, DC 20555

Dear Mr. Chilk,

In accordance with its responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, the U.S. Environmental Protection Agency (EPA) has reviewed the Nuclear Regulatory Commission's (NRC) Draft Generic Environmental Impact Statement (DGEIS) for License Renewal of Nuclear Power Plants, (NUREG 1437); Draft Proposed Rule 10 CFR Part 51 Environmental Review for Renewal of Operating Licenses (NUREG-1440); Draft Guidance for the Preparation of Supplemental Environmental Reports in Support of an Application to Renew a Nuclear Power Station Operating License (DG-4002); and Draft Environmental Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants (NUREG-1429); detailed in the Federal Register, September 17, 1991.

Previously, EPA provided generic scoping comments on October 22, 1991, on the advance notice of proposed rulemaking, and on the Notice of Intent to Prepare a Generic Environmental Impact Statement on the Renewal of Nuclear Power Plant Operating Licenses. In addition, verbal comments made by EPA panel members during the NRC workshop November 4 and 5, 1991, supplement EPA's written comments on the DGEIS. Additional information on editorial comments and biodiversity will be sent under separate cover.

Our written comments are provided in the following order: Generic Environmental Impact Statement for License Renewal of Nuclear Plants EPA Recommended Issue Category Changes (Enclosure 1); Generic Environmental Impact Statement for License Renewal of Nuclear Plants General Comments (Enclosure 2); Generic Environmental Impact Statement for License Renewal of Nuclear Plants Review of Issues (Enclosure 3); and EPA Comments on the Regulatory Impact Assessment for the Proposed Generic Environmental Impact Statement Rulemaking for License Renewal (Enclosure 4).

We have given the document an EO-2 rating, meaning that we have environmental objections (EO) concerning the environmental impacts of the action as proposed and that the DGEIS contains insufficient information (the "2" part of the rating) to evaluate the document thoroughly. Enclosure 5 is a copy of our alpha-numeric rating system definitions for your review.

Our objections focus on:

- the concept and approach used in categorizing issues, specifically, the overuse of Category 1 determinations which would: eliminate further consideration of environmental elements designated as Category 1 from future site specific reviews; limit public participation; and exclude site specific potential mitigating actions where applicable;

- the NRC proposed approach for future NEPA documentation on the GEIS;

- the bounding of potential impacts by the assumptions used in the DGEIS.

Our comments also request additional information and clarifications concerning media-specific issues and environmental standards and regulations.

We appreciate the opportunity to comment on the documents. If you have any questions concerning our comments please call me or have your staff contact Ms. Susan Offerdal (202-260-5059).

Sincerely,

Richard E. Sanderson
Director
Office of Federal Activities

Enclosures

Generic Environmental Impact Statement
For License Renewal of Nuclear Plants

EPA Recommended Issue Category Changes

All of the issues identified below were classified by NRC as Category 1 issues.

Recommended Impact Category	Issue	Page Numbers Found in Enclosure 3 for for Review of Issues
2	Altered Salinity Gradients	1
2	Altered Thermal Stratification of Lakes.	1
3	Discharge of Chlorine or Other Biocides	2
3	Water Use Conflicts	2
3	Refurbishment	3
2	Gas Supersaturation (Gas Bubble Disease)	4
2	Groundwater Use Conflicts (Surface Water Used as Make-up Water--Potentially Affecting Aquifer Recharge)	6
2	Groundwater Quality Degradation (Saltwater Intrusion)	6
2	Cooling Tower Impacts on Crops	7
2	Cooling Tower Impacts on Native Plants	7
2	Bird Collisions with Cooling Towers	8
2	Power Line Right-of-Way Management (Cutting and Herbicide Application)	8
2	Bird Collisions with Power Lines	8
2	Floodplains and Wetlands on Power Line Right-of-Way	8
2	Air Quality	9
3	Electromagnetic Fields, Chronic Effects	12
3	Aesthetic Impacts of Refurbishment	14
2	Off-Site Land Use Impacts of License Renewal Term	14
3	Radiological and Non-Radiological Impacts	16
2	Mixed Waste	19
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2	Severe Accidents (Atmospheric Releases)	21
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2	Severe Accidents (Releases from Groundwater)	24
2	Severe Accidents (Economic Consequences)	24
2	Waste Management	26
2	Need for Generating Capacity Via License Renewal	26
2	Advantages of Alternatives to License Renewal	28

Generic Environmental Impact Statement
for License Renewal of Nuclear Plants

General EPA Comments

Environmental Standards and Regulations:

1. In its comment letter dated October 22, 1990, concerning the Nuclear Regulatory Commission's (NRC's) Notice of Intent to prepare a Generic Environmental Impact Statement (GEIS) for License Renewal Nuclear Plants, the Environmental Protection Agency (EPA) states that the "GEIS should demonstrate compliance with all pertinent regulations,..." Also, NRC regulations regarding preparation of environmental reviews and draft environmental impact statements (10 CFR 51.45(d) and 51.71(e)) require the environmental report and draft environmental impact statement (DEIS) to describe the status of compliance with all federal permits, licenses, approvals, and other entitlements which must be obtained.

   The GEIS does not "demonstrate" compliance; compliance seems to be taken as a given. Further, a demonstration of compliance is not, but should be, called for in the DG-4002, "Guidance for Preparation of Supplemental Environmental Reports" or in the Draft Environmental Standard Review Plan.

2. NRC regulations at 10 CFR 51.71(d) state that a DEIS analysis must consider all environmental impacts irrespective of whether a certification or license from the appropriate authority has been obtained. A footnote to the subsection elaborates on this requirement, stating: "Compliance with the ...standards...of the Federal Water Pollution Control Act is not a substitute for and does not negate the requirement for NRC to weigh all environmental effects of the proposed action,..." Also, the regulation states,

   > 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 [National Environmental Policy Act], consider the radiological effects of the proposed action and alternatives.

   For numerous impact issues, the GEIS generically "resolves" the impact as a "small" impact by citing the fact that the impact is covered in a separate permitting action, the most commonly referenced permit being the National Pollutant Discharge Elimination System (NDPES) permit. This assessment approach is deficient in several respects. First, by omitting an assessment of the impact (possession of an environmental permit

does not imply that the activity has absolutely no negative effect) this approach makes a comparison of alternatives and the NRC required cost-benefit balancing superficial. To illustrate how this approach makes the comparative analysis difficult, consider a cost-benefit analysis for new coal capacity. Many impacts would be covered by other permits and standards, and would therefore be designated simply as "small". Thus, comparing the coal plant analysis results with the relicensing results would shed little light on the differences between the two alternatives.

Second, it appears that the approach fails to satisfy NRC's own interpretation of the proper method for satisfying NEPA, as the NRC codified in 10 CFR 51.

Finally, the analysis of mitigation options could be different when considering an additional 20 years of operation versus considering the 5 year period covered by a routine NPDES permit renewal. That is, the review for a 5 year NPDES permit renewal is not necessarily the same as the review for NPDES related issues in a DEIS for a 20-year relicensing period.

3. Given that NRC is amending its NEPA rule to streamline the relicensing of 118 plants and has already prepared a draft GEIS and revised guidance documents on its proposal, EPA questions whether it is appropriate for NRC to conclude in the preamble that the proposed regulation is the type of action that may be categorically excluded from a NEPA review.

Public Participation and Future Reviews:

1. In the notice of proposed rulemaking, on pages 47018-47019, the NRC states that public comments on individual license renewals will be limited to "unbounded" Category 2 issues and all Category 3 issues. Similarly, the proposed rule, GEIS, and guidance documents limit plant-specific environmental information requirements to these issues, excluding all Category 1 issues and "bounded" Category 2 issues. Since the GEIS is being prepared long in advance of many license renewal applications and without detailed disclosure of impacts at each of the plants, EPA recommends that the environmental assessments or supplementary EISs prepared for individual relicensing be explicitly "tiered" to the GEIS. Reference 40 C.F.R. 1502.4, 1502.20-21, 1508.28.

Consistent with NRC's goals, tiering "is appropriate when it helps the lead agency to focus on the issues which are ripe for decision and exclude from consideration issues already decided or not yet ripe." 40 C.F.R. 1508.28. Under this approach, plant-specific NEPA documents would need only summarize and incorporate by reference Category 1 and bounded Category 2 issues discussed in the GEIS, assuming that no

significant new circumstances or information had come to light that were not already considered in the GEIS. 40 C.F.R. 1502.20, 1502.9(c). Tiering the documents would also create an opportunity for a relicensing applicant to proffer any significant new information relevant to Category 1 or bounded Category 2 issues and give the public an opportunity to further review and comment on these issues at the relicensing stage.

EPA recognizes that NRC's proposed approach provides for periodic review of the GEIS findings and the possibility of petitioning NRC to amend 10 C.F.R. 51. However, EPA believes that tiering the generic and specific documents more readily places the range of potential environmental impacts of a particular relicensing in context for public review and also provides the applicant and public an important opportunity to identify, consistent with traditional NEPA practice, any new information relevant to Category 1 or 2 environmental concerns. To ensure that a reasonable period of time is available for the public to obtain and review the GEIS itself at the relicensing stage, EPA also recommends that the comment period on plant-specific environmental assessments (EAs) be extended to 60 days.

2. We are concerned about the potential for complicating the environmental disclosure and review process such that the public must cross many procedural hurdles before having an opportunity to comment on a particular relicensing action. Ultimately, the proposed process may prevent issues of concern from receiving adequate pubic review. Describe the NRC petitioning process which the public would use if they were to comment on a relicensing action.

3. The Council on Environmental Quality (CEQ) NEPA regulations regarding public involvement, at 40 CFR 1506.6(b)(3), address public notice procedures when the federal action has effects "primarily of local concern".

Although the rulemaking as proposed will preempt further consideration of Category 1 issues in individual EAs, this action is of local concern in the areas where nuclear plants are located. Has the NRC used any of the public notice procedures identified in the CEQ NEPA regulations (e.g., publication in local newspapers of general circulation)?

Bounding of Potential Impacts by the Assumptions Used in the GEIS:

1. DG-4002, "Guidance for the Preparation of Supplemental Environmental Reports", states that Chapter 1 of the applicant's environmental review should describe activities that will be taken to prepare for renewal and any changes in operations and maintenance during the renewal term (p. 12). This type of information is required by the proposed regulation 51.53(c)(2). However, no instructions for NRC reviewers could be found in

the Draft Environmental Standard Review Plan for verification that the plant, as proposed, is bounded by the GEIS. Is the review of this applicant information provided for in some other guidance document? If not, then it should be added to the Review Plan. How will the environmental review be handled if it turns out that the applicant's plans are not within the bounds used in the GEIS?

2.a. The fact that there is variation in coolant types, and that certain manufacturers constantly modify and upgrade their designs, leads to site specific idiosyncrasies that limit the applicability of this GEIS to all reactor license renewal actions. In addition to the unique designs at U.S. reactors, their geographic locations vary greatly both in terms of surrounding population densities and total facility acreages. Given the extremes in population density, very detailed EAs or EISs will be necessary to adequately address the impacts for each reactor subject to license renewal, despite the potential of the GEIS to aid in drawing conclusions about certain types of impacts.

2.b. The differences in individual plant performances must be taken into account. The most important component of a plant's safety systems are its personnel and management, mainly the health physics program and the reactor operators and engineers. The differences between plant performance can vary greatly even between plants owned by the same parent company. A plant's performance rating should be factored into the GEIS.

2.c. The differences between the pressurized water reactor (PWR) and the boiling water reactor (BWR) must also be taken into account. BWRs are known to have more extensive contamination and higher exposure levels compared to PWRs. Both the external and internal exposures are higher and a Category 1 GEIS does not adequately consider these differences.

3. The GEIS appears to assume that there will not be new transmission line construction, in existing or new corridors. If this assumption is correct, it should be stated as a condition for the generic conclusions reached regarding impacts associated with transmission lines.

4. The NRC states that it intends to periodically review conclusions in the GEIS findings presented in Appendix B of the proposed rulemaking. It is not clear when and how such reviews will be carried out. What will be the opportunities for public input in this process? EPA believes that the more inclusive approach recommended in the "Public Participation and Future Reviews" section above would allow for possible additional input on this issue by the relicensing applicant and public.

Concept of and Approach to Categorizing Issues:

1. It should be made clear that assigning a Category 1 to an issue is not the same as concluding that the impact is small. An issue is designated as Category 1 because its impact has been generically quantified and it applies to all plants. Whether or not the impact is small is a separate matter. However, in many instances in the GEIS, it appears that the concept of a Category 1 and the magnitude of the impact are used interchangeably. For example, see Section 3.10 on page 3-43.

2. A reviewer of the GEIS can easily get the impression that issues are presumed to be Category 1 and small, unless compelling evidence is presented to the contrary. In reality, the burden of proof for all issues should be on those who wish to make a generic conclusion (Category 1) regarding the impact. In many instances the GEIS neither supports the conclusions arrived at when categorizing impacts nor provides justification for classifying over 80 percent of the identified impacts as Category 1. By categorizing an impact as generically "small", it appears that no monitoring and mitigative actions will occur, leaving the entire issue of continuing monitoring and mitigation unaddressed. Notwithstanding this approach by NRC, the requirement to consider mitigation, and in appropriate cases monitoring, for adverse impacts remains. 40 C.F.R. 1502.16(h), 1505.2(c).

Benefit-Cost "Balancing" Analysis:

1. NRC regulations at 10 CFR 51.71 (d) require the DEIS to include a preliminary analysis which considers and balances the environmental and other effects of the proposed action. The GEIS has reached a conditional generic determination that the balancing favors licensing renewal. The Draft Regulatory Guide DG-4002, "Guidance for the Preparation of Supplemental Environmental Reports," states that license renewal applicants may consider those areas where their plant's impacts are clearly less or the benefits clearly greater than those found generically in the GEIS (p. 43.)

   This allowance for the introduction of plant-specific information appears one-sided. In the proposed rules, NRC indicates that, after the rule is finalized, comments will be limited to Category 2 and 3 issues. Yet license renewal applicants may introduce information to show that negative impacts are less severe than in the GEIS and benefits are greater than in the GEIS. It may be argued that this is fair and reasonable, since the GEIS essentially adopted "worst case", bounding scenarios, and therefore a plant that is not reflected in such scenarios should not be judged by their results. On the other hand, the designation of all Category 1 impacts as having a "small" magnitude, and the reliance on permitting standards instead of statements of impacts (the approach described above)

leaves little useful information regarding negative impacts. As a consequence, allowance of information favorable to renewal may have the tendency to distort the benefit-cost analysis.

2. The cost-benefit analysis of relicensing should not be confused with the analysis required by CEQ NEPA regulations. CEQ's regulations, at 40 CFR Part 1500, call for a clear comparison of the alternatives, not a cost-benefit analysis of the proposed action in isolation. A cost-benefit analysis of all alternatives, with results compared across alternatives, is more suited to satisfying these provisions of the NEPA regulations. However, it should be pointed out that Chapter 9 of the GEIS does compare alternatives in terms of impacts in each media category.

Generic Environmental Impact Statement
For License Renewal of Nuclear Plants

EPA Review of Issues

EPA-recommended impact category changes are placed in parentheses under the NRC Impact category.

A. SURFACE WATER

Effects of Refurbishment on Surface Water Quality **2**
Section 3.4.1, page 3-2; p. 10-7

Review Comments - The Regulatory Guide, DG-4002, should have an additional subpart under the "Information and Analysis Content for Effects of Refurbishment on Surface Water Quality." The additional subpart should suggest including a discussion of what evidence is necessary to show that best management practices (BMPs) are sufficient. It should also discuss alternative measures to implement if monitoring shows that BMPs are insufficient to meet water quality standards and to protect beneficial uses of receiving waters.

Historically, major refurbishment projects, such as steam generator replacement projects and recirc piping replacements projects, have required significant construction of new support buildings (shielded mausoleums, piping refab shops, welding shops) and new exterior staging and laydown areas. Most of these structures have little in the way of control mechanisms in place to provide "ready control" of potential discharges to surface waters. Previous major refurbishment projects indicate that a marked increase in the amount of outside activity will occur during the project. The amount of such activity and the associated risks for impact to surface waters require more consideration both in bounding which plants can be considered generically and which fall out of such an analysis.

Altered Salinity Gradients **1**
Section 4.2.1.2.2, page 4-5; p. 10-7; **(2)**
Section 4.3.2.2, page 4-26; Section 4.4.2.2, page 4-44;

Review Comments - Salinity gradients possibly should be considered a Category 2 issue since the impact and mitigation by plants with once-through cooling systems, specifically the Oyster Creek Nuclear Generating Station, on salinity gradients may require re-evaluation during the relicensing process.

Altered Thermal Stratification of Lakes **1**
Section 4.2.1.2.3, page 4-6; p. 10-7; **(2)**
Section 4.3.2.2, page 4-26; Section 4.4.2.2, page 4-44;

Enclosure 3

Review Comments - According to the Generic Environmental Impact Statement (GEIS), discharge of heating effluents has the potential for altering thermal stratification. In addition to intensifying stratification, changes in circulation may break down stratification. The issue should be reclassified as a Category 2 issue. Since altered thermal stratification is most likely to occur in once-through cooling systems, it should be evaluated on a site-specific basis for plants which produce this effect.

Scouring Due to Discharged Cooling Water 1
Section 4.2.1.2.3, page 4-7; p. 10-8;
Section 4.3.2.2, page 4-26; Section 4.4.2.2, page 4-44;

Review Comments - According to the GEIS, scouring due to discharged cooling water has been found to be a possible problem at plants with once-through cooling systems (e.g., San Onofre Nuclear Generating Station). Scoured sediments have resulted in increased turbidity, decreased light penetration, and increased flow of particulates near the bottom which have impacted wildlife and habitat.

Discharge of Chlorine or Other Biocides 1
Section 4.2.1.2.4, page 4-8 ; p. 10-8 (3)
Section 4.3.2.2, page 4-26; Section 4.4.2.2, page 4-44

Review Comments - EPA is currently studying more appropriate control mechanisms to address the in-stream acute and chronic toxicity of biofouling compound discharges. Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) data for biocides commonly only address human toxic reactions and testing is related only to the "active ingredient". Such datasets fail to provide necessary information of aquatic toxicity or whole product formulation (as used) toxicity. As each facility's discharge characteristics and the receiving water ecology are unique, these impacts should be reclassified as Category 3.

Discharge of Other Chemical Contaminants (e.g., metals) 1
Section 4.2.1.2.4, page 4-8; p. 10-8
Section 4.3.2.2, page 4-26; Section 4.4.2.2, page 4-44;
Section 4.4.4, page 4-47;

Review Comments - On page 4-45, lines 29-30, the GEIS indicates that there has been very little study of metal levels in cooling ponds. Absence of data does not necessarily indicate absence of an effect, particularly in this case where the cumulative effect of 20 additional years of discharge is in question.

Water Use Conflicts 1
Section 4.2.1.3, page 4-9; p. 10-9 (3)
Section 4.3.2.1, page 4-24; Section 4.4.2.1, page 4-43;

Review Comments - Without proper oversight, utilities may ignore and/or mitigate rather than avoid secondary and cumulative impacts to natural resource areas outside the plant boundaries. In addition, the current drought conditions across the Midwest and West increase the likelihood that water use conflicts will increase. Since water use

conflicts will need to be dealt with on a plant-by-plant basis, their impacts are not generic in nature and should therefore be considered Category 3 impacts.

A sufficient expendable water supply is essential for the operation of nuclear power plants, especially those with cooling towers or cooling ponds. Projected human use and preservation of aquatic habitat, riparian habitat and associated biota will compete with power plants for water supply. Although water use or water rights issues should be resolved with the appropriate state or federal agencies, it should not be settled independently, but should be done as part of the relicensing process to ensure an adequate water supply and equitable water use during the license renewal period.

In-stream uses may not be well represented in decision-making bodies that resolve water use conflicts.

General Comment on Surface Water Analysis

Information and discussions of altered thermal stratification in rivers and the availability of makeup water for cooling towers should be provided.

B. AQUATIC ECOLOGY

Refurbishment 1
Section 3.5, page 3-3; p. 10-9 (3)

Review Comments -

1. Aquatic ecology impacts resulting from refurbishment activities may be different from those associated with initial plant construction or routine operation. Significant improvement in receiving water quality over the past 20 years and the resulting return of indigenous populations of in-stream biota necessitate the reassessment on a site by site basis of the aquatic ecology impacts resulting from refurbishment activities. Such considerations should include potential current pattern disturbances, increased stream and sediment loadings of pollutants expected to be discharged, and alterations in thermal patterns within the water column (thermal plume residence, thermal barriers, cold shock). In light of this and the document's statement that there has been measurable accumulation of toxic metals (copper) in sediments and other impacts (e.g., gas bubble disease, depressed dissolved oxygen), this activity needs to be changed to a Category 3. Within the site specific evaluation, sublethal impacts (depressed reproduction, increased predation, species density shifts) should be more adequately considered.

Accumulation of Contaminants in Sediments or Biota 1
Section 4.2.1.2.4, page 4-8; p. 10-9
Section 4.3.3, page 4-26; Section 4.4.2.2, page 4-44;
Section 4.4.4, page 4-47;

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Review Comments - The GEIS does not state that the copper discharge problem, corrected at the cited plant, is not also taking place at any other plants. Moreover, being a cumulative impact, the absence of impact over the past years of operation does not prove that accumulations will not reach damaging levels over the additional 20 years of operation.

Cold Shock 1

Section 4.2.3.1.5, page 4-18; p. 10-10
Section 4.3.3, page 4-26; Section 4.4.4, page 4-47;

Review Comments - This is most likely a Category 1 issue; however, mitigative measures employed should be more fully described to justify the designation.

Premature Emergence of Aquatic Insects 1

Section 4.2.3.1.7, page 4-19; p. 10-10
Section 4.3.3, page 4-26;
Section 4.4.4, page 4-47;

Review Comments - The comment in the GEIS that localized effects on reproduction are inconsequential is overstated. For example, premature synchronized emergence of short-lived aquatic insects, such as Mayflies, would most likely affect the local population's ability to reproduce. However, in light of the comparatively small size of the impacted area to the overall habitat, premature emergence of aquatic insects should be considered a Category 1 issue, as presented.

Gas Supersaturation (Gas Bubble Disease) 1
(2)

Section 4.2.3.1.8, page 4-19; p. 10-10
Section 4.3.3, page 4-26; Section 4.4.4, page 4-47;

Review Comments - According to the GEIS, gas bubble disease (GBD) has been mitigated at the one nuclear power plant (Pilgrim Nuclear Power Station) where large numbers of fish were affected. However, the GEIS does not indicate that GBD is not occurring at other plants; therefore, gas bubble disease should be considered a Category 2 issue. Moreover, the GEIS assertion that "Plant modification associated with license renewal will not result in greater risk of GBD" does not justify GBD as a Category 1 issue if GBD is already a problem.

Low Dissolved Oxygen in the Discharge 1

Section 4.2.3.1.9, page 4-20; p. 10-11
Section 4.3.3, page 4-26; Section 4.4.4, page 4-47;

Review Comments - By definition, a "small" impact means that no mitigation or detailed investigation needs to be considered. But this issue has been a concern and is being monitored at the Sequoia plant (GEIS, p. 4-20), which seems to contradict the

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definition of "small".

Losses From Predation, Parasitism, and Disease Among Organisms Exposed to Sublethal Stresses 1

Section 4.2.3.1.10, page 4-20; p. 10-11
Section 4.3.3, page 4-26; Section 4.4.4, page 4-47;

Review Comments - The literature cited is too limited to adequately evaluate this issue. Also, the statement in Section 4.2.3.2, "Although significant localized effects of these stresses have occasionally been demonstrated, the populations' rapid regeneration times and biological compensatory mechanisms are apparently sufficient to preclude long-term or farfield impacts," is excessively presumptive and contradicts a statement under 4.2.3.1.10, ". . . the best evidence for impacts (or lack of impacts) may come from long-term monitoring of fish populations."

For Plants with Once-Through Cooling Systems

Entrainment of Fish and Shellfish Early Life Stages 2

Section 4.2.3.1.2, page 4-16; p. 10-12

Review Comments - While Section 316(b) of the Clean Water Act does establish available technology for impingement and entrainment mitigation, the process of refurbishment for extended operation in effect substantively changes the conditions of operation under which these determinations were made. As the relicensing process (and the associated plant operation and design changes) are part of the federal activity providing for this change, it is appropriate that impingement and entrainment be discussed in the GEIS and considered as part of the relicensing process.

Impingement of Fish and Shellfish 2

Section 4.2.3.1.3, page 4-17; p. 10-12

Review Comments - Same as above.

Heat Shock 2

Section 4.2.3.1.4, page 4-17; p. 10-12

Review Comments - While Section 316(a) does provide a mechanism for discharges to adopt alternate thermal effluent limitations, the process of refurbishment and extended operation in effect substantively changes the conditions of operation under which these determinations were made. As the relicensing process (and the associated plant operation and design changes) are part of the federal activity providing for this change, it is appropriate that thermal discharge impacts be discussed in the GEIS and considered as part of the relicensing process.

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B. General Comment on Aquatic Ecology Analysis

Beyond heat and cold shock, the stress of additional heat burden on organisms at the extreme ends of their ranges should be addressed.

C. GROUNDWATER

Groundwater Use Conflicts (Potable and Surface Water) 2
Section 4.2.2.1.1, page 4-11; p. 10-15

Review Comments - Power plants surrounded by extensive salt marshes should also consider this issue as part of the relicensing process so as not to mine and possibly deplete a potential Paleo-groundwater resource which may not be replenished by recharge.

Groundwater Use Conflicts (Surface Water Used as Make-up Water--Potentially Affecting Aquifer Recharge) 1
Section 4.2.2.1.3, page 4-13; p. 10-15 (2)

Review Comments - As stated under Review Comment A.12., a sufficient expendable water supply is essential for the operation of nuclear power plants, especially those with cooling towers or cooling ponds. Since projected human use may compete with power plants for water supply, groundwater use conflicts should be considered a Category 2 issue. Although water use or water rights issues should be resolved with the appropriate state or federal agencies, it should not be settled independently, but should be done as part of the relicensing process to ensure an adequate water supply and equitable water use during the license renewal period.

Groundwater Quality Degradation (Saltwater Intrusion) 1
Section 4.2.2.2.1, page 4-14; p. 10-16 (2)

Review Comments - This should be considered a Category 2 issue. Just because some nuclear power plants are a minor contributor to salt water intrusion does not preclude their respective impacts on affected aquifers. Moreover, the comment in this section, "Saltwater intrusion into confined aquifers is not yet considered to be a problem in Florida, . . ." is a false statement; saltwater intrusion is occurring which also may justify this as a Category 2 issue.

Groundwater Quality Degradation (Cooling Ponds) 2
Section 4.4.3, page 4-46; p. 10-16

Review Comments - The GEIS should include provisions for instituting monitoring programs for both the cooling pond water and groundwater of the uppermost aquifer underlying the facility. The monitoring program should be based on an understanding

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of the site hydrogeology (groundwater flow direction and rate, degree of aquifer interconnection, porosity, and storativity) and should make provisions for quality assurance and quality control (QA/QC) of data. Design of the monitoring well network should be based on current guidance, such as Handbook of Suggested Practices for the Design and Installation of Groundwater Monitoring Wells, by Aller et al., 1989 (available from the National Water Well Association, Dublin, Ohio). The GEIS should also include a paragraph which commits to remedial action(s) should the monitoring programs detect a release of a hazardous substance pursuant to relevant federal, state, and local hazardous waste management requirements.

Two additional subparts should be added to the Regulatory Guide (DG-4002) requirements for Information and Analysis Content for Effects of Refurbishment on Groundwater Quality. The first new subpart should recommend evaluating all historical information that is available from monitoring cooling pond water and the groundwater of the uppermost aquifer underlying the facility. The second new subpart should emphasize ensuring compliance with all applicable federal, state, and local hazardous waste management requirements.

C. General Review Comments on Groundwater

1. Potential sink hole formation from lowered potentiometric heads in confined aquifers should be evaluated in the relicensing process for power plants which depend on those groundwater resources.

2. Potential impacts on sole source aquifers should also be evaluated in the relicensing process for power plants which rely on such resources.

D. TERRESTRIAL ECOLOGY

Cooling Tower Impacts on Crops 1
Section 4.3.4, page 4-27; p. 10-17 (2)

Review Comments - Both mechanical and natural draft cooling towers have been shown to cause increased salt deposition within approximately two kilometers of the tower. While the salt drift has been shown to have little impact on off-site crops, the effects of other biocides (e.g., chromium) have not been fully investigated. If, as part of refurbishment, a change in cooling tower biocides is proposed, it may be necessary to perform a site-specific evaluation. The cooling tower impact on crops should therefore be considered a Category 2 issue.

Cooling Tower Impacts on Native Plants 1
Section 4.3.5.1, page 4-35; p. 10-17 (2)

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Review Comments - The impact of icing on native plants at the Palisades Nuclear Plant is not adequately explained to determine that it was a one-time incident. Therefore, cooling tower impacts on native plants possibly should be reconsidered to include potential mitigation at Palisades.

In addition, cooling towers, particularly mechanical draft cooling towers, have been shown to result in increased heavy metal deposition (chromium and zinc) and vegetative damage possibly from sulfate emissions. The source of these substances appears to be biocides added to the cooling water. As changes in biocides may be a factor in refurbishment, cooling tower impacts on native plants should be considered a Category 2 issue.

Bird Collisions with Cooling Towers 1
Section 4.3.5.2, page 4-38; p. 10-17 (2)

Review Comments - Illumination of cooling towers should be considered in the relicensing process to reduce avian mortality. Therefore, bird collisions should be considered a Category 2 issue to provide mitigation at those plants with cooling towers that do not have illumination.

Power Line Right-of-Way Management (Cutting and Herbicide Application) 1
Section 4.5.6.1, page 4-60; p. 10-17 (2)

Review Comments - This should be considered a Category 2 issue to ensure that two stipulations are included in the license renewal: (1) only herbicides approved for right-of-way (ROW) use by EPA are employed; and (2) application is done exclusively by a licensed operator. These conditions are not presented in the GEIS as current requirements.

Bird Collisions with Power Lines 1
Section 4.5.6.2, page 4-63; p. 10-18 (2)

Review Comments - This should be reconsidered as a Category 2 issue for power plant associated transmission lines that cross wetlands used by large concentrations of birds or that transect major flyways. Mitigative measures for these lines should be considered as part of the relicensing process (e.g., orange aviation balls, spiral vibration dampers).

Floodplains and Wetlands on Power Line Right-of-Way 1
Section 4.5.7, page 4-70; p. 10-18 (2)

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Review Comments - This should be considered a Category 2 issue to ensure that two stipulations are included in the license renewal: (1) if new line construction occurs, it should avoid bogs because of their extremely slow recovery; and (2) line maintenance in wetlands should occur in winter, whenever possible, to minimize damage to vegetation.

It is essential that the proposed rule clarify what is meant by "standard practices" at this stage. This is critical for disclosure purposes, so that there is adequate opportunity for review of those "standard practices". NRC should refer to the Clean Water Act Section 404 (b)(1) Guidelines and the U.S. Army Corps of Engineers Regulatory Guidance Letter dated July 18, 1990. Impacts to wetlands should first be avoided, then minimized, then mitigated, where avoidance and minimization are not feasible.

Threatened or Endangered Species 3
Section 3.5, page 3-3; p. 10-18
Section 3.6, page 3-4; Section 4.2.1.1, page 4-2;

Review Comments - The Regulatory Guide, DG-4002, should add the following provision to "Information and Analysis Content for Threatened or Endangered Species": If, after review by the appropriate Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS) Office, it is determined that relicensing and its associated activities will affect a threatened or endangered species, a Section 7 consultation with the USFWS or NMFS, as appropriate, should follow.

The GEIS and Regulatory Guide should also indicate that applicants are to determine if "candidate" species are present.

Air Quality 1
Section 3.3, page 3-2; p. 10-19 (2)

Review Comments - To the extent that relicensing a nuclear power plant may cause or contribute to any new violation or increase the frequency or severity of any existing violation, the project may not be in conformity with the requirements of the Clean Air Act. The GEIS should discuss these issues. Further, this issue should be classified as Category 2 and applicants in non-attainment areas undertaking relicensing should prepare supplemental environmental documentation, which should specifically discuss project conformity with the requirements of the Clean Air Act as amended.

E. PUBLIC HEALTH

Radiation Exposures to the Public 1
Section 3.8.1.7, page 3-37; p. 10-19

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Review Comments

1. Throughout the GEIS and in Table B-1 of the proposed rule, radiation doses are assigned to Category 1 because the NRC reached a conclusion about the impact that applies to all affected plants. We concur in this conclusion. The NRC has also concluded that the significance of the radiation exposures are "small" and, thereby, warrant neither detailed investigation nor consideration of mitigative actions. One of the bases for concluding that the impacts are small is that, in the case of radiation exposures to the public, the doses are small with respect to natural background. Though we concur that the radiation exposures are small, comparison to natural background is not a compelling argument. A more appropriate argument is that the risks associated with the exposures are consistent with the risks judged not to warrant mitigative measures. An example is the risk criterion established by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for determining the conditions under which remedial actions are warranted. Another argument that would be appropriate is that the risks are comparable to, or less than, the risks associated with the alternatives to license renewal.

2. The risk coefficients provided in Table 3-10 (page 3-32) are somewhat misleading. The table states that the range of the risk of fatal cancer is 0 to 4E-04 per rem for occupational exposure and 0 to 5E-04 per rem for exposure of the public. However, the 90 percent confidence limit for fatal cancers cited in the Biological Effects of Ionizing Radiation V (BEIR V) report is 1.2E-03 per rem for adults. Even accounting for the dose rate reduction factor, the values reported in the GEIS appear low.

3. Section 3.8.1.5 (page 3-32) refers to the off-site doses due to refurbishment activities as being comparable to the doses from routine operation. Some discussion is needed of the potential releases of hot particles which can deliver relatively high localized dose rates. During routine operations, off-site exposures to hot particles are unlikely. However, hot particles can be generated during refurbishment activities and should be addressed.

4. On page 3-31,the GEIS states that the somatic and genetic risk estimators used were the ones employed by the NRC in the Federal Register notice promulgating the new NRC "below regulatory concern" policy. It should be noted that the NRC has deferred actions on petitions for rulemaking that deal with "below regulatory concern" in order to initiate a "consensus building process." This resulted from the onslaught of adverse criticism that this concept generated. Therefore, we believe the use of this policy in conjunction with risk estimated from radiation exposures is inappropriate.

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Occupational Radiation Exposures — 1

Section 3.8.2.4, page 3-42; p. 10-19

Review Comments

1. The conclusion on page 3-42 that the "upper-limit cancer and genetic risks from radiation exposures attributable to refurbishment were compared with natural incidence and found to be much less than 1% of the natural background rates" is not very reassuring. The natural incidence of fatal cancer is 1 in 5 and the natural incidence of serious genetic effects is about 6% of all births. In addition, cancer and genetic effects are not necessarily "natural." At least a portion of the incidence is likely due to anthropomorphic sources of environmental mutagens.

   We concur in the conclusion that occupational exposures are Category 1, but it is difficult to conclude that the exposures are small. Many workers are exposed to doses in excess of 1 to 2 rem/year, which, over a 10 year period, is associated with a lifetime cancer risk of about 1%. A 1% chance of acquiring a cancer is not small. CERCLA establishes that a negligibly small lifetime risk of cancer is in the range of 1E-06 to 1E-04.

2. The occupational and public doses associated with refurbishment and replacement activities, as listed in Table 2.6 (page 2-31), have been assigned to Category 1. How would the license renewal process proceed if the applicant plans on activities that include replacement of the pressure vessel, or some other relatively intrusive activity?

3. A review of operating experience associated with major component replacement reveals occupational doses from steam generator repairs as high as 3500 person rems, 872,000 work hours, and a 10 month outage. The exposures and outage duration are somewhat higher than those in Table 2-7 (page 2-33). See NUREG/CR-3540, NUREG/CR-4160, EPRI-NP-2418. Though the exposures are generally consistent with the literature we have reviewed, they do not appear to be bounding (i.e., Category 1).

4. An independent check of the cumulative occupational doses confirms the values in Table 3.12 (page 3-39).

5. An independent check on the costs of plant modifications confirms the value of $140 million cited on page 3-39.

6. The GEIS reference to "Relatively high collective occupational doses" on page 3-39 should be quantified and the scenarios under which this would occur should be defined. Since the man-rem dose levels are already diluted by a high number of low level radiation workers who rarely receive any dose at all, it seems that

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the actual doses to the "real" radiation worker is not accurately reflected.

7. The GEIS assumes that the risk is small by providing various exposure results from the Nuclear Industry. However, these numbers are not realistic. The exposures given include a high number of personnel who are considered "radiation workers" but include guards, fire watch, sampling personnel, dosimetry personnel, and other support personnel. The support personnel can include secretaries, equipment issue/delivery personnel and plant management personnel who all wear dosimetry but rarely receive any significant dose. These personnel dilute the actual dose received by the hard core workers and misrepresent the actual doses by several factors. Thus, the actual cancer risk to these workers is higher than the GEIS leads us to believe.

Electromagnetic Fields (EMF), Chronic Effects 1
Section 4.5.4.2, page 4-57; p. 10-20 (3)

Review Comments - Relicensing of 118 nuclear power plants is projected to occur through 2030. During this time span, electromagnetic field (EMF) impacts and mitigation should become more clearly understood. To determine the scale and direction of impact as "small" is premature when even the evaluation of recent research has not been completed by EPA. Given the current status of knowledge and EMF impacts, and since the extent of transmission lines and potential impacts associated with each plant differs, this issue should be considered in the relicensing process for each facility. Only through this approach can application of the best available knowledge and mitigation technology be ensured.

The proposed rulemaking should state that: (1) EPA is evaluating the public health effects of electromagnetic fields, and (2) the renewal procedure will address EPA's position relative to public health at the time of renewal.

Radiation Exposures to Public 1
Section 4.6.2.4, page 4-82; p. 10-20

Review Comments

1. The population doses from routine emissions, as calculated using the methods referred to on page 3-30 (i.e., NUREG/CR-2850), are somewhat misleading because they do not account for the complete environmental dose commitment from the very long-lived emissions, specifically C-14. Typical C-14 emissions from commercial light water reactors are approximately 8 Curie/yr (Ci/yr) and the environmental dose commitment from C-14 is approximately 500 person rems per Curie released to the atmosphere. Accordingly, the environmental dose commitment from C-14 alone is about 4000 person rem per year per plant. The population doses presented in Tables 4.7 and 4.8 (pages 4-78 and 4-79) do not

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appear to include this aspect of the dose.

2. How does cooling tower drift affect the dispersion and deposition of the atmospheric discharge of radioiodines and particulates?

3. Referring to Table 4.6 (page 4-76), a recent study published by EPA has determined (using AIRDOS-EPA) that the maximum individual effective dose equivalent (EDE) associated with routine atmospheric emissions for 1988 for boiling water reactors (BWRs) range from 0.0001 to 0.989 millirem/yr (mrem/yr), with an average of 0.053. For pressurized water reactors (PWRs), the range is 0.0004 to 0.103, with an average of 0.013 (EPA 520/1-91-019, August 1991). Accordingly, the values in Table 4.6 are reasonable, if not conservative.

4. Comparisons to background radiation, such as those on page 4-80, should be avoided since it implies that the risk of natural background is negligible. In addition, using the average dose within a 50 mile radius of a plant seems arbitrary. There are two kinds of assessments that are relevent: 1) the maximum dose to representative members of the public; and 2) the collective dose to the world's population that results from the anticipated license renewal period of a power plant.

5. The discussion on page 4-80 regarding trends may be misleading. There was certainly a decrease in off-site exposures following the publication of Appendix I to 10 CFR 50. In addition, there have been improvements in fuel performance, which probably are also responsible for a decline in the source term. However, it is not apparent that these trends will continue. It is probably more appropriate to assume that the routine release rates will remain fairly constant during the period of license renewal.

6. Page 4-82 refers to a possible doubling of the population in the vicinity of nuclear power plants during the period of license renewal. An independent analysis of population trends in the vicinity of nuclear power plants revealed that the population is growing at an average rate of about 2% per year. Over a 20 year period, this corresponds to an approximate 1.5-fold population increase. Accordingly, the assumed 2-fold increase is conservative.

Occupational Radiation Exposures 1

Section 4.6.3.3, page 4-85; p. 10-21

Review Comments

1. An independent evaluation of the occupational exposures presented in Table 4.10 (page 4-83) confirmed the reported values. The discussion should also point out

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that the doses from internal emitters are a very small fraction of the reported external doses. (see Harward, D. Nucl. Eng. Intl. 308:28-32, 1981). It should also be pointed out that the doses are predominantly from low-linear energy transfer (LET) radiation. This has significance in terms of assessing the risks from the exposures.

2. The GEIS should address the possibility that the declining average annual occupational dose rates (see Table 4.10 on page 4-83) may be due, in part, to the practice of badging an increasing number of site personnel, even though many of them have little potential for exposure.

3. On page 4-84, reference is made to the low dose rates associated with occupational exposures and likens the exposures to background radiation. This is somewhat misleading. Unlike exposure to natural background, occupational exposures are delivered at a relatively high dose rate (i.e., mrem/hour to as high as rem/hour dose rates) as compared to background radiation, which is delivered at uR/hour exposure rates.

F. SOCIO-ECONOMICS

Transportation Impacts of Refurbishment 3
Section 3.7.4.2, page 3-15; p. 10-22

Review Comments - The Regulatory Guide (DG-4002) should add a subpart to the section on Information and Analysis Content for Transportation Impacts of Refurbishment. The new subpart should recommend evaluating air quality impacts, particularly in non-attainment areas. Air quality impact assessments should include carbon monoxide, particulate matter, ozone, and reactive organic gases.

Aesthetic Impacts of Refurbishment 1
Section 3.7.7, page 3-22; p. 10-23 (3)

Review Comments - Since impacts are admitted to be unquantifiable, and such impacts are clearly site-specific, the closer review that would be afforded in an impact assessment for each individual plant's license renewal may be the best available mechanism for ensuring that significant aesthetic impacts are not overlooked. Aesthetic impacts should perhaps be concluded to be Category 2 impacts, subject to consideration in each plant's license renewal, for plants that will undertake refurbishment activities beyond certain pre-determined bounds..

Off-Site Land Use Impacts of License Renewal Term 1
Section 4.7.5, page 4-95; p. 10-22 (2)

Impact Category

Review Comments - The GEIS text projects that there may be significant impacts for Wolf Creek, due to tax increase-driven impacts. The GEIS concludes that tax-driven changes cannot be categorized as having a positive or negative impact and therefore is Category 1. However, the prospect that relicensing could result in what some people would consider to be a significant negative impact would seem to suggest that this impact should be subject to review in certain license renewal reviews. Bounds could be set such that this impact would need be reviewed only for certain plants.

Historic Resources Impacts of License Renewal Term (transmission lines) 1
Section 4.5.8, page 4-71; p. 10-22

Review Comments - Since there was very little description of the affected environments and of the impacts alluded to, the conclusion that such impacts are Category 1 is not satisfactorily substantiated. Also, there should be a clarification that the conclusion applies only to existing transmission lines.

Historic Resources Impacts of License Renewal Term (normal operations) 1
Section 4.7.7, page 4-98; p. 10-23

Review Comments - (Same comment as above, for issue F.12) Since there was very little description of the affected environments and of the impacts alluded to, the conclusion that such impacts are Category 1 is not satisfactorily substantiated. The GEIS states that "perceptions of adverse impacts on historic and aesthetic resources from the continued operation of nuclear power plants are probable in limited circumstances."

Aesthetic Impacts of License Renewal Term 1
Section 4.7.7, page 4-98; p. 10-23

Review Comments - Since there was very little description of the affected environments and of the impacts alluded to, the conclusion that such impacts are Category 1 is not satisfactorily substantiated. Also, the GEIS states that "perceptions of adverse impacts on historic and aesthetic resources from the continued operation of nuclear power plants are probable in limited circumstances."

Aesthetic Impacts of License Renewal Term (transmission lines) 1
Section 4.5.8, page 4-71; p. 10-23

Review Comments - Since there was very little description of the affected environments and of the impacts alluded to, the conclusion that such impacts are Category 1 is not satisfactorily substantiated.

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Category

G. URANIUM FUEL CYCLE

Radiological and Non-Radiological Impacts 1
Section 4.8, page 4-101; p. 10-23 (3)

Review Comments

1. Again, natural background radiation is not a good criterion for concluding the impacts are small. The emphasis should be on the impacts relative to the currently feasible alternatives, as summarized in Tables 9.1 and 9.2.

2. The impacts from radon emissions from the fuel cycle should be expressed in terms of person working level months (WLMs), in addition to dose, since the risk coefficients for exposure to radon progeny are correlated to exposures expressed in units of WLMs. The concept of "dose" is not very useful when discussing the risks of exposure to radon progeny.

3. NRC's assessment of the public health impact of its fuel cycle operations is incomplete, and is currently the subject of a rulemaking hearing that will be concluded after the GEIS is completed. The revision of Table S-3 should be completed before the GEIS is completed and reviewed along with the GEIS.

   The deficiencies in Table S-3 are that health impacts are calculated on an inconsistent basis for different radionuclides. Some are based on 50 miles; only a few are global. They all should be global. The radionuclides of concern are ^{3}H, ^{14}C, ^{85}K, ^{129}I, and radon from mining and milling. A second inconsistency is the timeframe for assessments. This should preferably be the same as that for high level waste (10,000 years). In cases where pathway calculations are available for the longer time frame (e.g., I-129), a 1,000 year time frame could be used.

   Finally, the GEIS and Table S-3 use inconsistent health risk coefficients. NRC acknowledges this, but the GEIS and Table S-3 efforts do not appear to be sufficiently coordinated. NRC's commonly used 5×10^{-4} rem^{-1} would be acceptable, and is used by the GEIS, but, Table S-3 used 2×10^{-4}.

4. The doses and risks associated with the management of high level and low level radioactive wastes should refer to the generic analyses performed in support of the 10 CFR 60 and 61. For high level waste, the design criterion is 10 effects per 10,000 years per 1000 metric tons of initial heavy metal (MTIHM).

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Category

5. The GEIS should expand upon its discussion of the applicability of Table S-3 of 10 CFR 51 to the period of license renewal. In general, Table S-3 has several inherent conservatisms that provide assurance that it applies to a broad range of conditions, including those that may be encountered during the period of license renewal. The following summarizes the major conservatisms:

   - o The commitment of land is conservative due to the cumulative effects of multiple conservative assumptions such as high capacity factors, the open-pit mining assumptions, and the exclusion of foreign fuel supplies.

   - o Reprocessing is included in Table S-3 although it is not currently part of the fuel cycle.

   - o An important contributor to impacts is the resource consumption required for uranium fuel enrichment via gaseous diffusion. In the future, use of atomic vapor laser isotope enrichment technology would decrease water use, fossil fuel use, and non-radiological emissions.

   - o The non-radiological emissions are highly conservative since it is assumed that the power required for enrichment is obtained entirely from coal-fired plants with minimal effluent controls. In fact, power is provided to a grid from a mix of generating facilities. In addition, the emissions estimated don't coincide with the large reductions in SO_2 and particulate emissions following the 1977 and 1990 Clean Air Act Amendments and state clean air standards.

   - o Low-level radioactive waste volumes are overestimated due to the volume reductions occurring in response to the Low-Level Waste Policy Act of 1980 and the 1985 Amendments Act.

   - o The values in Table S-3 reflect the sum of the highest impacts of each component of the fuel cycle for the once-through and recycle mode. Accordingly, the values are conservative for both modes; however, see the comment above on the accuracy of Table S-3.

6. Page 6-29 refers to extended fuel burn-up as a means for reducing the quantity of spent fuel. The current version of Table S-3 is specifically limited to 33,000 MWD/MT burn-up. However, the NRC has ruled that Table S-3 also applies to extended burn-up (53 FR 6040, February 29, 1988). The GEIS should make it clear that the use of extended burn-up during the period of license renewal does not invalidate Table S-3 of 10 CFR 51. This ruling also applies to Table S-4 of 10 CFR 51, which addresses transportation impacts of the fuel cycle.

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7. The GEIS should contain a more detailed justification in the consideration of surface water and aquatic ecology impacts from extension of the fuel cycle life resulting from relicensing. Additional fuel mining, milling, separation, enrichment, and processing will all have quantifiable negative impacts on the surface waters of the U.S.

II. WASTE MANAGEMENT

Nonradiological Waste 1

Section 6.2, page 6-3; p. 10-24

Review Comments - Information is not provided to substantiate a conclusion that there are no concerns with nonradiological waste disposal at any plants. For example, is there ample disposal capacity for any large quantities of construction debris that may be generated?

As for hazardous waste management, the GEIS relies on the Resource Conservation and Recovery Act (RCRA), without describing the generation of hazardous waste or evaluating in any way the impacts of hazardous waste management.

The GEIS should include a paragraph on solid waste which acknowledges the Pollution Prevention Act of 1990 and endorses its policy that, "...pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner."

Low-Level Radioactive Waste Storage 2

Section 6.3.2, page 6-16; p. 10-25

Review Comments

1. A discussion is needed regarding how Decontamination and Decommissioning (D&D) impacts may change if low level waste is stored on-site for the 20 year period of license renewal.

2. On page 6-21, except for possible habitat destruction, the impact of on-site storage of low-level waste is judged to be insignificant. The fact that on-site storage can be managed within the occupational and public radiation exposure limits does not mean the impacts are insignificant. They should be quantified. The Regulatory Guide (DG-4002) should provide additional guidance for determining when this impact is other than small and thereby requires a mitigation plan.

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Low-Level Radioactive Waste Disposal 2
Section 6.3.3, page 6-21; p. 10-25

Review Comments

1. At the bottom of page 6-1 it states that the impacts of low-level waste disposal are not addressed in the GEIS because of the minimal impacts. The fact that each applicant for a license to own and operate a low-level waste disposal facility is required to prepare a Safety Analysis Report and an Environmental Report, and that the NRC will prepare an EIS for each license, implies that the impacts are not insignificant. For example, the commitment of land, the current absence of numerical groundwater criteria, and the 25 mrem/yr performance objective are not insignificant. These impacts should be quantified, discussed, and explicitly factored into the cost-benefit balance in the GEIS.

2. In a similar manner, the fact that the impacts of spent fuel management are managed under 10 CFR 60 doesn't mean that the impacts are negligible. They should also be explicitly addressed.

3. At the top of page 6-13 it refers to the use of 100 cpm above background as a cutoff criterion for when trash is disposed of as low level waste versus transport to a landfill. This is a de-facto below regulatory concern (BRC) criterion, and the NRC has withdrawn the BRC Policy Statement pending a negotiated rulemaking. The Draft Regulatory Guide (DG-4002) should provide additional guidance for determining when this impact is other than small and thereby requires a mitigation plan.

Mixed Waste 1
Section 6.4, page 6-26; p. 10-25 (2)

Review Comments

1. The impacts of mixed waste should be assigned to Category 2 for the same reason as the impacts of low level waste; i.e., a general conclusion cannot be made regarding whether the waste will be stored on-site or disposed of at a licensed facility. Until disposal capacity for mixed waste is available, it is not prudent to re-license plants without considering what disposal capacity will be available. In keeping with the "cradle to grave" philosophy of the Resource Conservation and Recovery Act, supplemental environmental documentation should discuss in detail provisions made for the disposal of mixed wastes which will be generated

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subsequent to license renewal.

2. Referring to the top of page 6-28, a recent EPA contractor report, entitled "Integration of As Low As Reasonably Achievable (ALARA) with RCRA Requirements for Radioactive Mixed Hazardous Waste" (Contract No. 68D90170) addresses the applicability of ALARA to the RCRA requirements. The intent of the report is to provide guidance to mixed waste petitioners for seeking exemptions from current RCRA regulations based on ALARA considerations. The status of this work should be discussed with EPA to determine its applicability to this issue in the GEIS.

3. The extended life cycle of nuclear power plants will substantially increase the quantities of mixed wastes. The ability of each site to adequately control mixed wastes on site should be considered.

Spent Fuel 1
Section 6.5, page 6-28; p. 10-25 (2)

Review Comments

1. See comment 5 for the Uranium Fuel Cycle.

2. See Comment 2 for Low-Level Waste Disposal.

3. It seems highly unlikely that any new long-term sites will be easily identified and developed in the near future. Thus, advocating the use of pool and dry storage methods to temporarily accommodate spent fuel avoids addressing the larger issue of identifying reasonable long-term storage for spent reactor fuel. Rather than allowing the utilities to create more spent fuel to be temporarily stored on-site, we recommend that the NRC consider focusing on solving the long-term storage issue and then proceed with license renewal.

4. There is little indication from the discussion about the technical feasibility and availability of dry storage methods to accommodate spent fuel at each nuclear power plant. We do not know which utilities are pursuing dry storage methods as an option, how many nuclear power plants in the U.S. can utilize these storage techniques, and how much fuel could be stored in this manner. Without this information it is difficult to agree with the conclusion that dry storage can accommodate the additional spent fuel created after the renewal process is completed.

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I. POSTULATED ACCIDENTS

Severe Accidents (Atmospheric Releases) 1
Section 5.3.3.2, page 5-17; p. 10-24 (2)
Section 5.5.2, page 5-112;

Review Comments

1. The GEIS concludes that severe accidents fall into Generic Category 1 (Table 10.1, page 10-24). This means that a generic conclusion has been reached once and for all for the 118 nuclear power plants considered, based on the analysis given in the GEIS.

   The severe accident analysis in the GEIS is based on the severe accident analyses given in the Final Environmental Statements (FESs) for 28 plants. These plants are listed in Table 5.1 of the GEIS. Site-specific characteristics of the remaining 90 plants and population growth for all plants are taken into account by using a variable called the exposure index (EI), which is a function of population surrounding the plant weighted by the site-specific wind direction frequency. This appears to be a reasonable approach to accounting for the major factors that influence the consequence analysis for severe accidents. However, the source terms and core melt frequencies used in these FES analyses are predominantly those developed for the Reactor Safety Study (RSS), "rebaselined" in 1981 for use in FESs. This means that a single source term and core melt frequency (specific to the Surrey plant) was used for each of the 17 PWRs and another source term and core melt frequency (specific to the Peach Bottom plant) for each of the 11 BWRs. Use of a single "generic" source term for each of the two plant types hardly seems to satisfy the expressed intent to perform a bounding analysis using plant- and site-specific data. And without bounding the impacts or establishing the envelope, it is not possible to conclude that the impacts are addressed by the GEIS once and for all (i.e., Category 1).

   The NRC might argue that the RSS source terms and core melt frequencies are sufficiently conservative so as to establish the envelope of severe accident risk. In fact, the GEIS (in Table 5.11) demonstrates that the severe accident risks derived using this approach are at least an order of magnitude higher than the results given in NUREG-1150, which contains plant- and site-specific analyses for five plants, including Surrey and Peach Bottom. This is comforting, but hardly conclusive.

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We realize that plant-specific source terms and accident frequencies have not yet been evaluated for all plants. However, each licensee has been requested by the NRC to perform an individual plant examination (IPE) to assess the vulnerabilities to both internal and external events (discussed in Section 5.4.1.2.2 of the GEIS). In order to satisfy this request, nearly all plants are performing "level-one probabilistic risk assessment (PRAs)," from which source terms and accident frequencies fall out, and these assessments are expected to be completed over the next couple of years, but in all cases well before the NRC acts on specific license renewal applications. Accordingly, the NRC might consider reclassifying severe accidents into Category 2, "a generic conclusion on the impact has been reached for all affected nuclear power plants that fall within defined bounds." Once the IPEs have been completed, each licensee could determine whether the plant-specific source terms and core melt frequencies derived in the IPE fall within the bounds of the generic RSS source terms and core melt frequencies used in the GEIS. If this test were to be satisfied, the severe accident analysis results given in the GEIS could be considered to suffice for that plant. If not, a severe accident analysis would be required to be submitted with the license renewal application.

2. An assumption which is implicit in the severe accident analysis is that accident frequencies will not increase during the period of license renewal "because regulatory controls ensure that the plant's licensing basis is maintained and improved, where warranted" (Section 5.5). Indeed, the proposed license renewal rule requires in Part 54.21 an integrated assessment by each licensee "which demonstrates that age-related degradation of the facility's systems, structures, and components has been identified, evaluated, and accounted for as needed to assure that the facility's licensing basis will be maintained throughout the term of the renewed license."

   The importance of controlling aging through the implementation of aging management programs is discussed in Appendix C to NUREG-1362 ("Regulatory Analysis for Proposed Rule on Nuclear Power Plant License Renewal"). This Appendix shows that core damage frequencies may be increased by an order of magnitude or more due to aging of plant components and structures. However, the Appendix further demonstrates that the influence of aging on core damage frequencies can be controlled by the appropriate implementation of a maintenance and testing program. The examples used in the Appendix to illustrate appropriate aging management techniques apply probabilistic techniques to derive the risk importance of various plant components and structures for hypothesized accident sequences.

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The management of aging prescribed in the proposed Part 54 is predicated on the maintenance of the facility's licensing basis. This means that the licensee must demonstrate that aging does not jeopardize the ability of the plant to comply with the plant's technical specifications, the regulations, the orders, the Safety Analysis Report, and all of the other commitments made by each utility as a condition of its license with the NRC. Although there is probably a relationship between these prescriptive and deterministic criteria and risk, this has never been made explicit.

Therefore, it is not clear that the management of aging through the maintenance of the plant's licensing basis will necessarily maintain the risk from severe accidents at current levels. This issue requires clarification by the NRC.

3. In Section 5.2.1.4, the GEIS states that based on information compiled by the United Nation's Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), the National Academy of Sciences, and the International Commission on Radiological Protection, the risk estimates for fatal cancers range from 0 to 500 per million person-rem. This is not correct. The 90% confidence limits given in BEIR V are 500 to 1,200 additional fatal cancers per 100,000 people for exposure to 10 rem (500 to 1,200 per million-person rem), and risk coefficients possibly a factor of two lower for exposure at low doses and dose rates (p.6 BEIR V).

4. On page 5-3, line 7, it is stated that the principal radiological hazard associated with the accidental release of radioiodines is from ingestion. Inhalation is of greater concern than ingestion, as is external whole body exposure.

Severe Accidents (Fallout Onto Open Bodies of Water) 1
Section 5.3.3.3, page 5-39; p. 10-24 (2)
Section 5.5.3, page 5-113;

Review Comments

1. Comments 1 and 2 above also apply to fallout onto open bodies of water.

2. On page 5-44, line 24, it is stated that runoff is not addressed in the analysis of the impacts. The GEIS should demonstrate that runoff is not a significant contributor to risk as compared to direct deposition on the water. Studies that address this subject include:

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Codell, R.B., 1985. Potential Contamination of Surface water Supplies by Atmospheric Releases from Nuclear Plants, Health Physics. 49, 713.

Ritchie, L.T., et al. 1978. Effects of Rainstorms and Runoff on Consequences of Atmospheric Releases from Nuclear Reactor Accidents, Nuclear Safety, 19, 220.

Menzel, R.G., 1974. Land Surface Erosion and Rainfall as Sources of Sr-90 in Streams, J. Environ. Quality., 3, 219.

Helton, J.C. et al., 1985. Contamination of Surface water Bodies after Reactor Accidents by Erosion of Atmospherically Deposited radionuclides, Health Physics., 48. 757.

3. In Table 5.14b (page 5-52), are sedimentation processes accounted for in the residence times, and, if not, could such processes affect the results of the analyses?

4. On the bottom of page 5-56, reference is made to the doses associated with the ingestion of aquatic organisms. We assume the bioaccumulation factor approach was used to calculate doses. If so, it is questionable whether the bioaccumulation factor approach can be reliably used under conditions where the activity in the water and sediment are undergoing rapid change.

Severe Accidents (Releases from Groundwater) **1**
Section 5.3.3.4, page 5-60; p. 10-24 (2)
Section 5.5.4, page 5-113;

Review Comments

1. Comments 1 and 2 on the issue Severe Accidents (Atmospheric Releases) also apply to releases to groundwater.

Severe Accidents (Economic Consequences) **1**
Section 5.3.4, page 5-90; p. 10-24 (2)
Section 5.5.5, page 5-113;

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Review Comments

1. Comments 1 and 2 above on the issue Severe Accidents (Atmospheric Releases) also apply to assessment of economic impacts.

2. The GEIS uses the Exposure Index (EI) concept to normalize economic impacts. However, the EI concept uses only a met-sector-weighted-population, which is appropriate for assessing public health impacts but not for economic impacts. The primary economic impact is the contamination of farm land. As a result, weighting by population is not appropriate.

J. DECOMMISSIONING

Radiation Doses 1

Section 7.3.1, page 7-19; p. 10-26
Section 7.4, page 7-28;

Review Comments

1. The top of page 7-1 states that decommissioning impacts are limited to those activities required to terminate an NRC license. The total impacts associated with returning the site to greenfield conditions need to be addressed.

2. Due to the lack of a residual radioactivity rule, there is some question whether the generic impacts provided in NUREG-0586, especially costs, are subject to change once the NRC or the EPA issues such a rule. This matter should be discussed in the GEIS.

3. The D&D impacts presented in this chapter are based on the NUREG-0586, which is the EIS in support of the D&D rulemaking. NUREG-0586 generically characterizes D&D impacts in a realistic manner to support a rulemaking. We believe each D&D operation will be supported by a site specific EIS addressing all the issues. Accordingly, the D&D rulemaking EIS was not designed to bound impacts. As a result, it is questionable whether NUREG-0586 can be used to categorically exclude the impacts, unless it is demonstrated in the GEIS that NUREG-0586 bounds the impacts for all plants.

4. The statement on page 7-17 that "...atmospheric releases for decommissioning are less than 100 milliCurie (mCi), whereas normal operations average about 3000 Ci/yr" is somewhat misleading since the releases from normal operations are

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relatively short lived noble gases while D&D emissions are longer lived particulate radionuclides that have much higher dose conversion factors.

5. At the top of page 7-4 it states that, because the PWR turbines are not part of the primary loop, they normally are not contaminated. However, primary to secondary leakage is a normal and expected part of plant operations. Accordingly, the turbines will be slightly contaminated at the end of plant life.

Waste Management 1
Section 7.3.2, page 7-22; p. 10-26 (2)
Section 7.4, page 7-28;

Review Comments

1. The GEIS notes that the rate of low-level waste generation may be greater than levels facilities are accustomed to receiving. Because of the potentially increased levels and/or quantities of low-level wastes and the uncertainty associated with developing new low-level waste disposal facilities, this issue should be classified as Category 2. Facilities located in compact areas that have either not developed low-level waste disposal facilities or where disposal capacity is uncertain should prepare supplemental environmental documentation.

2. At the top of page 7-13 it states that activated metal cannot be decontaminated. Melt-refining and electro-refining can be used to decontaminate and recycle activated metals. If such processes are found to be cost-effective, the costs and impacts of decommissioning could be sharply reduced, especially since waste disposal costs are a major contributor to D&D costs (see Table 7.10 on page 7-26).

K. NEED FOR GENERATING CAPACITY

Need for Generating Capacity Via License Renewal 1
Section 8, page 8-1; p. 10-4 (2)

Review Comments - Even if it can be concluded that generating capacity is needed, the conclusion that license renewal is needed is premature. In an EIS process, the need for the project is questioned in two parts. In this case, the first question is whether generating capacity is needed. The second question, which is essentially the subject of the entire EIS, is whether the proposed action (license renewal) is the "best" alternative for meeting the need. Since the GEIS has not resolved all of the impact issues (i.e.,

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there are Category 2 and 3 issues), an affirmative answer to the latter question cannot yet be established, and therefore it cannot be generically concluded that there is a need for generating capacity via license renewal. This issue should be re-worded to state simply "Need for generating capacity."

As for the Pacific 1 Region, since need for generating capacity is not well supported by the data presented in Appendix H, perhaps the need for capacity issue should be classified as Category 2, and subject to review in the environmental assessments of plants in the Pacific 1 region.

Inclusion in Appendix H of additional information from the referenced studies, such as the SAND NUPLEX study, would help to substantiate the conclusions and ensure reviewers of an opportunity to examine more of the underlying assumptions.

We question the GEIS's ability to project whether or not the capacity supplied by the nuclear plants would be needed in the relatively distant future. Regardless of the conclusions in the GEIS, an examination of need by the state utility regulatory authority will take place nearer the time of license renewal. Therefore, a generic conclusion at this time does not have the benefit of avoiding the effort of examining need in the future.

Recent reports indicate that Electric Power Research Institute predictions for demand have been over-estimated because they underestimated the effects of conservation and increased use of more energy efficient appliances and equipment. Given that a license renewal will cover a 20-year period, there needs to be flexibility in the process to allow for consideration of technologies which are currently infeasible or as yet unknown and to consider regional differences in need based on alternative energy sources. The process also needs to provide for the public to review and comment on the purpose and need for continuing a project.

Direct Economic Benefit of Generating Capacity 1
Section 2.1, page 2-1; p. 10-5

Review Comments - We do not see the relevance of this "benefit" for a National Environmental Policy Act (NEPA) review process. The need for capacity, already addressed as the issue above, sets the premise for the remainder of the EIS: what are the impacts of the alternative means to meet that need (and of the no action alternative). It means little to say that the relicensing alternative has the benefit of meeting this need; the other alternatives are also selected to meet this need and therefore should also have

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this benefit.

Direct Economic Benefit of Electric Energy — 1
Section 2.1, page 2-1; p. 10-5

Review Comments - See comment to the issue above (Direct Economic Benefit of Generating Capacity).

L. ALTERNATIVES TO LICENSE RENEWAL

Advantages of Alternatives to License Renewal — 1 (2)
Chapter 9, page 9-1; p. 10-4

Review Comments - The GEIS concludes that, "overall the issue...is considered to be Category 1, subject to an economic threshold analysis." If the conclusion that license renewal is the best alternative holds for plants that meet economic thresholds, then this issue falls under the definition of Category 2.

If geothermal is potentially competitive in certain areas, then Chapter 9 should have included these sources in its comparison of environmental impacts, which was limited to fossil fuel and nuclear power plants.

A discussion is needed of the radiation doses associated with routine atmospheric emissions of naturally occurring radionuclides in the fly ash of coal plants. Studies have shown that these doses are comparable to the doses from the routing radiological emissions from nuclear power plants (see the UNSCEAR Reports).

Given the time frame over which a license renewal could apply and the fact that it is difficult to predict what technological advances may be available and how those advances could affect a regional need, the process should provide for evaluating alternatives as a part of a site-specific document.

Direct Economic Benefits of Avoided Costs — 2
Section 9.4.5, page 9-38; p.10-5
Section 9.5, page 9-41; and Appendix H

Review Comments - The threshold values given in the Appendix are based on an economic comparison to coal-fired plants. Are thresholds derived from such a comparison also appropriate in areas of the western U.S. where geothermal energy is

said to be a potential alternative to nuclear plant license renewal?

Direct Economic Costs of Operation and Maintenance **2**
Section 9.4.5.4, page 9-40; p. 10-6
Section 9.5, page 9-41;

Review Comments - What are the assumed costs of low-level radioactive waste disposal? Are these assumptions conservative?

L. General Comment on Alternatives Analysis

It seems redundant to present both the avoided cost benefit and the three direct costs associated with relicensing, since avoided cost incorporates the direct costs in order to compare them to costs of the coal-fired power alternative.

EPA Comments on the Regulatory Impact Assessment for
the Proposed GEIS Rulemaking for License Renewal

The methods and calculations in the Regulatory Impact Assessment (RIA) were reviewed. Our revised analysis, presented below, indicates that significant costs savings to the industry may be expected by the adoption of Alternative B (generic rulemaking). However, as indicated at item 3 below, there are scenarios where the costs of Alternative B would be greater than Alternative A. Two overall shortcomings are evident in the RIA. One shortcoming is that no serious effort has been made to address whether or not both alternatives actually provide the same benefits of full and open public participation in the process and, if so, the significance of front loading the costs of participation on interveners. Indeed, the Executive Order mandating preparation of regulatory impact analyses calls for a "description of potential costs, including any adverse effects that cannot be quantified in monetary terms..." A second weakness is that the analysis of costs misses the key issue, namely, whether the higher development costs of Alternative B are offset by the magnitude of the future savings.

1. The discussion asserting the identity of the benefits under the two alternatives is not fully compelling. The key issue is not really whether the impacts will be identical under the two alternatives. Rather, it is whether or not the certainty that the impacts are within acceptable limits will be identical under both alternatives. The RIA analysis alludes to this issue in its brief discussion of the costs that interested parties will incur to participate in the process. For groups opposed to the extension of licenses, the generic treatment of a range of impacts may cause them not only to expend considerable resources at the beginning of the process (which might well be more of a burden than committing even greater resources over a longer period of time), but also to feel that the purpose of the generic environmental impact statement (GEIS) was to exclude them from full participation in the process. Additional consideration and discussion of this issue appears to be warranted.

2. The labor rate of $47.90 for the Nuclear Regulatory Commission (NRC) is not valid. The implementation of "Full Cost Recovery", as mandated by the Congress, has resulted in a 1991 cost of $115/hr. Moreover, these "NRC costs" will now be billed directly to licensees. The RIA should reflect this change, both in the labor rate assigned to the NRC and the headings of the cost elements. Suggested changes would be:

   Industry Costs = Industry Analysis and Submission Costs
   NRC Costs = Costs for the NRC to Review and Approve Documents.

3. The assumption used on the rate of license renewal applications, i.e., 12 years prior to operating license expiration, is reasonable. The intermediate scenarios assuming 25 and 50 percent renewal rates are also reasonable to bound the analysis. However, the sensitivity analysis could explicitly consider the importance of timing, particularly with

respect to the partial renewal scenarios, rather than simply relying on the assertion that this is not important (see p. 11). The 25 percent renewal scenario with only the 29 most recently licensed plants seeking renewal provides the bounding case. Evaluation of this scenario shows that Alternative B is less expensive than Alternative A at discount rates of 0 and 5%, but more expensive at a 10 percent discount rate. If coupled with the upper bound estimate of the effort involved in report preparation and review, this low/late participation scenario might not be cost effective at even low discount rates.

4. Table 1, NRC Costs and Total Costs should be corrected as follows to reflect the NRC labor rate of $115.

Millions of 1991 $s

	% Renewal	0%	5%	10%
NRC Costs				
	25	10.5	6.0	4.0
	50	20.4	11.4	7.4
	100	40.0	22.1	14.2
Total Costs				
	25	25.5	14.6	9.8
	50	49.5	27.7	18.0
	100	97.2	53.7	34.4

5. The per plant cost estimates for Alternative B do not reflect the discussion in the text. In Section 4.3.1, the Average Plant Cost (undiscounted) is given as $134,000. However, the text provides the following data:

10,000 hours/full ER
97 issues/full ER
Average hours/issue = 10,000/97 = 103 hours/issue
22 issues/Alternative B ER
$49.30/hr.

Industry cost per plant for Alternative B ER = 22 issues/plant X 103 hours /issue X $49.30/hour = 111,700.

Total (undiscounted) industry costs are 114 plants @ 111,700/plant + 2 plants @ 493,000/plant = 13,700,000.

For NRC Costs the calculation is analogous, except that the hours/issue and $/hr are 3,000/97 = 31 and $115, respectively. Thus, the NRC costs are:

NRC cost per plant for Alternative B ER = 22 issues/plant X 31 hours /issue X $115/hour = 78,400.

Total (undiscounted) NRC Costs are 114 plants @ 78,400/plant + 2 plants @ 345,000/plant = 9,600,000.

6. Table 2 costs should be corrected to reflect the accurate costing of NRC labor hours at $115/hr, and the correct per plant costs developed above for Alternative B.

7. Table 3 and all subsequent tables must be revised to reflect the corrections to the NRC labor rate and/or the costs of per plant submissions.

8. Including the appropriate development costs and properly computing the industry and NRC costs, the corrected data for a summary table would be as follows:

Present Value of Development & Implementation Costs
for Alternatives A & B and Net Costs of Alternative B
(millions of 1991 $)

Renewals	Discount Rate	Alternative A	Alternative B	Net Costs
100%				
	0%	98.6	28.9	(69.7)
	5%	55.1	19.0	(36.1)
	10%	35.8	14.6	(21.2)
50%				
	0%	50.9	18.1	(32.8)
	5%	29.1	13.1	(16.0)
	10%	19.4	10.9	(8.5)
25%				
	0%	27.0	12.6	(14.4)
	5%	16.1	10.1	(6.0)
	10%	11.2	9.1	(2.1)

Note: These costs assume the schedule of renewals used in the RIA, implementation costs of $1,430,000 for Alternative A and $5,554,000 for Alternative B, and per plant review costs (industry + NRC) of $838,000 for Alternative A and $190,000 for Alternative B.

9. The costs of Alternative B do not appear to include the costs of "periodic review" of GEIS findings, which NRC has stated an intention of conducting.

10. Section 4.5.1, Regulatory Development Costs. The relegation of the regulatory development costs to the sensitivity analysis is inappropriate. Granting that the benefits of the two alternatives are identical, and granting that the per plant costs of report preparation and review is lower for Alternative B than for Alternative A, the only issue is the comparison of the present worth of the expenditures over time for Alternative A (higher per plant costs and lesser development costs) with Alternative B (lesser per plant costs with higher development costs). Stated in simple terms, the issue is whether it is worthwhile to spend additional dollars now to reduce the future costs of environmental document preparation and review.

The characterization of the NRC development costs for Alternative B as "sunk costs", while technically correct, is misleading. Given that the real issue (see comment 9) is whether or not it is advantageous to spend X million dollars today to avoid incurring some fraction of Y dollars per year over the next 30 years, it is inappropriate to characterize the X million dollars in development costs as sunk costs and ignore them in the main cost analysis. As written, pages 7 through 18 of the RIA do little more than prove that for any value of Z (number of plants), if X (Alternative B implementation cost/plant) is less than Y (Alternative A implementation cost/plant), then the present value of ZX is less than ZY for any discount rate.

SUMMARY OF RATING DEFINITIONS
AND FOLLOW-UP ACTION*

Environmental Impact of the Action

LO--Lack of Objections
The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC--Environmental Concerns
The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO--Environmental Objections
The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alterna tive or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory
The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1--Adequate
EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably avail able to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information
The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potentially significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment.

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