From: Alicia Mullins
To: Frederick A. Monette
Date: 03/19/2007 4:07:16 PM
Subject: SSES Draft Sections

Fred,

Attached are the SSES Draft Sections 1, 2, 3, 4, and 9. The Section-front document contains the Abstract, Contents, Figures, Tables, Executive Summary and Abbreviations/Acronyms.

If you have any questions contact me.

Thanks,

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Abstract

The U.S. Nuclear Regulatory Commission (NRC) considered the environmental impacts of renewing nuclear power plant operating licenses (OLs) for a 20-year period in its *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2, and codified the results in 10 CFR Part 51. In the GEIS (and its Addendum 1), the staff identifies 92 environmental issues and reaches generic conclusions related to environmental impacts for 69 of these issues that apply to all plants or to plants with specific design or site characteristics. Additional plant-specific review is required for the remaining 23 issues. These plant-specific reviews are to be included in a supplement to the GEIS.

This supplemental environmental impact statement (SEIS) has been prepared in response to an application submitted to the NRC by PPL Susquehanna, LLC (PPL) to renew the OLs for Susquehanna Steam Electric Station, Units 1 and 2 (SSES) for an additional 20 years under 10 CFR Part 54. This draft SEIS includes the NRC staff's analysis that considers and weighs the environmental impacts of the proposed action, the environmental impacts of alternatives to the proposed action, and mitigation measures available for reducing or avoiding adverse impacts. It also includes the staff's preliminary recommendation regarding the proposed action.

Regarding the 69 issues for which the GEIS reached generic conclusions, neither PPL nor the staff has identified information that is both new and significant for any issue that applies to SSES. In addition, the staff determined that information provided during the scoping process did not call into question the conclusions in the GEIS. Therefore, the staff concludes that the impacts of renewing the SSES OLs will not be greater than impacts identified for these issues in the GEIS. For each of these issues, the staff's conclusion in the GEIS is that the impact is of SMALL significance (a) (except for collective offsite radiological impacts from the fuel cycle and high-level waste and spent fuel, which were not assigned a single significance level).

Regarding the remaining 23 issues, those that apply to SSES, are addressed in this draft SEIS. For each applicable issue, the NRC staff concludes that the significance of the potential environmental impacts of renewal of the OLs is SMALL. The staff also concludes that additional mitigation measures are not likely to be sufficiently beneficial as to be warranted. **(pending any Cat 2 mitigation discussions this may need to be reworded) The staff determined that information provided during the scoping process did not identify any new issue that has a significant environmental impact. [Fred check pending Epstein contentions]**

[a] The GEIS was originally issued in 1996. Addendum 1 to the GEIS was issued in 1999. Hereafter, all references to the "GEIS" include the GEIS and its Addendum 1.

The NRC staff's preliminary recommendation is that the Commission determine that the

adverse environmental impacts of license renewal for SSES are not so great that preserving the option of license renewal for energy-planning decisionmakers would be unreasonable. This recommendation is based on (1) the analysis and findings in the GEIS; (2) the Environmental Report submitted by PPL; (3) consultation with Federal, State, and local agencies; (4) the NRC staff's own independent review; and (5) the NRC staff's consideration of public comments received during the scoping process.

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Executive Summary

By letter dated September 13, 2007, PPL Susquehanna, LLC (PPL) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) to renew the operating licenses (OLs) for Susquehanna Steam Electric Station Units, 1 and 2, (SSES) for an additional 20-year period. If the OLs are renewed, State regulatory agencies and PPL will ultimately decide whether the plant will continue to operate based on factors such as the need for power or other matters within the State's jurisdiction or the purview of the owners. If the *OLs* are not renewed, then the units must be shut down at or before the expiration dates of the current OLs, which are July 17, 2042, for Unit 1, and March 23, 2044, for Unit 2.

The NRC has implemented Section 102 of the National Environmental Policy Act (NEPA) (42 USC 4321) in Title 10 of the Code of Federal Regulations (CFR), Part 51 (10 CFR Part 51). In 10 CFR 51.20(b)(2), the Commission requires preparation of an EIS or a supplement to an EIS for renewal of a reactor OL. In addition, 10 CFR 51.95©) states that the EIS prepared at the OL renewal stage will be a supplement to the *Generic Environmental Impact Statement for License Renewal of Nuclear Plant*s (GEIS), NUREG-1437, Volumes 1 and 2.[a]

Upon acceptance of the PPL application, the NRC began the environmental review process described in 10 CFR Part 51 by publishing a notice of intent to prepare an EIS and conduct scoping. The staff visited the SSES site in August 2007 and held public scoping meetings on November 15, 2006, in Berwick, Pennsylvania. In the preparation of this supplemental environmental impact statement (SEIS) for SSES, the staff reviewed the PPL Environmental Report (ER) and compared it to the GEIS, consulted with other agencies, conducted an independent review of the issues following the guidance set forth in NUREG-1555, Supplement 1, the *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal*, and considered the public comments received during the scoping process. The public comments received during the scoping process that were considered to be within the scope of the environmental review are provided in Appendix A, Part 1, of this SEIS.

The staff will hold two public meetings in Berwick, Pennsylvania, in March 2008, to describe the preliminary results of the NRC environmental review, to answer questions, and to provide members of the public with information to assist them in formulating comments on this SEIS. When the comment period ends, the staff will consider and address all of the comments received. These comments will be addressed in Appendix A, Part 2 of the final SEIS.

[a] The GEIS was originally issued in 1996. Addendum 1 to the GEIS was issued in 1999. Hereafter, all

references to the "GEIS" include the GEIS and its Addendum 1.

This SEIS includes the NRC staff's preliminary analysis that considers and weighs the environmental effects of the proposed action, the environmental impacts of alternatives to the proposed action, and mitigation measures for reducing or avoiding adverse effects. It also includes the staff's preliminary recommendation regarding the proposed action.

The Commission has adopted the following statement of purpose and need for license renewal from the GEIS:

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

The evaluation criterion for the staff's environmental review, as defined in 10 CFR 51.95(c)(4) and the GEIS, is to determine

> ... whether or not the adverse environmental impacts of license renewal are so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable.

Both the statement of purpose and need and the evaluation criterion implicitly acknowledge that there are factors, in addition to license renewal, that will ultimately determine whether an existing nuclear power plant continues to operate beyond the period of the current OL.

NRC regulations [10 CFR 51.95(c)(2)] contain the following statement regarding the content of SEISs prepared at the license renewal stage:

> The supplemental environmental impact statement for license renewal is not required to include discussion of need for power or the economic costs and economic benefits of the proposed action or of alternatives to the proposed action except insofar as such benefits and costs are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation. In addition, the supplemental environmental impact statement prepared at the license renewal stage need not discuss other issues not related to the environmental effects of the proposed action and the alternatives, or any aspect of the storage of spent fuel for the facility within the scope of the generic determination in § 51.23(a) ["Temporary storage of spent fuel after cessation of reactor operation-generic determination of no significant environmental impact"] and in accordance with § 51.23(b).

The GEIS contains the results of a systematic evaluation of the consequences of renewing an OL and operating a nuclear power plant for an additional 20 years. It evaluates 92 environmental issues using the NRC's three-level standard of significance--SMALL, MODERATE, or LARGE--developed using the Council on Environmental Quality guidelines. The following definitions of the three significance levels are set forth in footnotes to Table B-1 of 10 CFR Part 51, Subpart A, Appendix B:

> SMALL - Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.
>
> MODERATE - Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
>
> LARGE - Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

For 69 of the 92 issues considered in the GEIS, the analysis in the GEIS reached the following conclusions:

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

(2) A single significance level (i.e., SMALL, MODERATE, or LARGE) has been assigned to the impacts (except for collective offsite radiological impacts from the fuel cycle and from high-level waste and spent fuel disposal).

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

These 69 issues were identified in the GEIS as Category 1 issues. In the absence of new and significant information, the staff relied on conclusions as amplified by supporting information in the GEIS for issues designated as Category 1 in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B.

Of the 23 issues that do not meet the criteria set forth above, 21 are classified as Category 2 issues requiring analysis in a plant-specific supplement to the GEIS. The remaining two issues, environmental justice and chronic effects of electromagnetic fields, were not categorized. Environmental justice was not evaluated on a generic basis and must be addressed in a plant-specific supplement to the GEIS. Information on the chronic effects of electromagnetic fields was not conclusive at the time the GEIS was prepared.

This draft SEIS documents the staff's consideration of all 92 environmental issues identified in the GEIS. The staff considered the environmental impacts associated with alternatives to license renewal and compared the environmental impacts of license renewal and the alternatives. The alternatives to license renewal that were considered include the no-action alternative (not renewing the OLs for SSES) and alternative methods of power generation. Based on projections made by the U.S. Department of Energy's Energy Information Administration (DOE/EIA), gas- and coal-fired generation appear to be the most likely power-generation alternatives if the power from SSES is replaced. These alternatives are evaluated assuming that the replacement power generation plant is located at either the SSES site or some other unspecified alternate location.

PPL and the staff have established independent processes for identifying and evaluating the significance of any new information on the environmental impacts of license renewal. Neither PPL nor the staff has identified information that is both new and significant related to Category 1 issues that would call into question the conclusions in the GEIS. Similarly, neither the scoping process nor the staff has identified any new issue applicable to SSES, that has a significant environmental impact. Therefore, the staff relies upon the conclusions of the GEIS

for all of the Category 1 issues that are applicable to SSES.

PPL's license renewal application presents an analysis of the Category 2 issues plus environmental justice and chronic effects from electromagnetic fields. The staff has reviewed the PPL analysis for each issue and has conducted an independent review of each issue. Five Category 2 issues are not applicable, because they are related to plant design features or site characteristics not found at SSES. Four Category 2 issues are not discussed in this draft SEIS, because they are specifically related to refurbishment. PPL has stated that its evaluation of structures and components, as required by 10 CFR 54.21, did not identify any major plant refurbishment activities or modifications as necessary to support the continued operation of SSES, for the license renewal period. In addition, any replacement of components or additional inspection activities are within the bounds of normal plant operation, and are not expected to affect the environment outside of the bounds of the plant operations evaluated in the U.S. Atomic Energy Commission's 1972 Final Environmental Statement Related to Operation of Susquehanna Steam Electric Station.

Twelve Category 2 issues related to operational impacts and postulated accidents during the renewal term, as well as environmental justice and chronic effects of electromagnetic fields, are discussed in detail in this draft SEIS. Five of the Category 2 issues and environmental justice apply to both refurbishment and to operation during the renewal term and are only discussed in this draft SEIS in relation to operation during the renewal term. For all 12 Category 2 issues and environmental justice, the staff concludes that the potential environmental effects are of SMALL significance in the context of the standards set forth in the GEIS. In addition, the staff determined that appropriate Federal health agencies have not reached a consensus on the existence of chronic adverse effects from electromagnetic fields. Therefore, no further evaluation of this issue is required. For severe accident mitigation alternatives (SAMAs), the staff concludes that a reasonable, comprehensive effort was made to identify and evaluate SAMAs. Based on its review of the SAMAs for SSES, and the plant improvements already made, the staff concludes that none of the candidate SAMAs are cost-beneficial.

Mitigation measures were considered for each Category 2 issue. Current measures to mitigate the environmental impacts of plant operation were found to be adequate, and no additional mitigation measures were deemed sufficiently beneficial to be warranted.

Cumulative impacts of past, present, and reasonably foreseeable future actions were considered, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. For purposes of this analysis, where SSES license renewal impacts are deemed to be SMALL, the staff concluded that these impacts would not result in significant cumulative impacts on potentially affected resources.

If the SSES operating licenses are not renewed and the units cease operation on or before the

expiration of their current operating licenses, then the adverse impacts of likely alternatives will not be smaller than those associated with continued operation of SSES. The impacts may, in fact, be greater in some areas.

The preliminary recommendation of the NRC staff is that the Commission determine that the adverse environmental impacts of license renewal for SSES, are not so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable. This recommendation is based on (1) the analysis and findings in the GEIS; (2) the ER submitted by PPL; (3) consultation with other Federal, State, and local agencies; (4) the staff's own independent review; and (5) the staff's consideration of public comments received during the scoping process.

Abbreviations/Acronyms

□	degree
µCi	microcurie(s)
µCi/ml	microcuries per milliliter
µGy	microgray(s)
µm	micrometer(s)
µSv	microsieverts
ac	acre(s)
ACC	averted cleanup and decontamination costs
AEA	Atomic Energy Act of 1954
AEC	U.S. Atomic Energy Commission
AOC	present value of averted offsite property damage costs
AOE	present value of averted occupational exposure
AOSC	present value of averted onsite costs
APE	present value of averted public exposure
ATWS	anticipated transient without scram
Bq	becquerel(s)
BMT	basemat melt-through
Btu	British thermal unit(s)
BWR	boiling water reactor
C	Celsius
CDF	core damage frequency
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Ci	curie(s)
cm	centimeter(s)
COE	cost of enhancement
COPC	chemicals of potential concern
CWA	Clean Water Act
DBA	design-basis accident
DOE	U.S. Department of Energy
DPR	demonstration project reactor
DSM	demand-side management
EIA	Energy Information Administration (of DOE)

EIS	environmental impact statement
ELF-EMF	extremely low frequency-electromagnetic field
EOP	Emergency Operating Procedure
EPA	U.S. Environmental Protection Agency
EQ	equipment qualification
ER	Environmental Report
ESA	Endangered Species Act
ESRP	Environmental Standard Review Plan, NUREG-1555, Supplement 1, Operating License Renewal
F	Fahrenheit
FAA	Federal Aviation Administration
FES	Final Environmental Statement
FR	Federal Register
FSAR	Final Safety Analysis Report
ft	foot/feet
FWPCA	Federal Water Pollution Control Act (also known as the Clean Water Act of 1977)
FWS	U.S. Fish and Wildlife Service
gal	gallon
GDC	general design criteria
GEIS	Generic Environmental Impact Statement for License Renewal of Nuclear Plants, NUREG-1437
gpm	gallons per minute
ha	hectare(s)
HLW	high-level waste
hr	hour(s)
Hz	Hertz
in.	inch(es)
ISFSI	independent spent fuel storage installation
kg	kilogram(s)
km	kilometer(s)
kV	kilovolt(s)
kV/m	kilovolt per meter
kWh	kilowatt hour(s)
L	liter(s)

lb	pound
LNG	liquefied natural gas
LOCA	loss-of-coolant accident
LWR	light-water reactor
m	meter(s)
m/s	meter(s) per second
m^3/d	cubic meters per day
m^3/s	cubic meter(s) per second
mA	milliampere(s)
MACCS2	MELCOR Accident Consequence Code System 2
mi	mile(s)
mGy	milligray(s)
mL	milliliter(s)
mph	miles per hour
mrad	millirad(s)
mrem	millirem(s)
mSv	millisievert(s)
MT	metric ton(s) (or tonne[s])
MTU	metric ton(s)-uranium
MW	megawatt(s)
MWd/MTU	megawatt-days per metric ton of uranium
MW(e)	megawatt(s) electric
MW(t)	megawatt(s) thermal
MWh	megawatt hour(s)
NA	not applicable
NAS	National Academy of Sciences
NCI	National Cancer Institute
NEPA	National Environmental Policy Act of 1969
NESC	National Electric Safety Code
ng/J	nanogram per joule
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NMFS	National Marine Fisheries Service
NO_x	nitrogen oxide(s)
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NWPPC	Northwest Power Planning Council
ODCM	Offsite Dose Calculation Manual

OL	operating license
PM_{10}	particulate matter, 10 microns or less in diameter
ppt	parts per thousand
PRA	Probabilistic Risk Assessment
PSA	Probabilistic Safety Assessment
PSD	prevention of significant deterioration
PSW	plant service water
RAB	reactor auxiliary building
RAI	request for additional information
RCP	reactor coolant pump
RCS	Reactor Coolant System
REMP	radiological environmental monitoring program
rms	root mean square
ry	reactor year
s	second(s)
SAG	Severe Accident Guideline
SAMA	Severe Accident Mitigation Alternative
SAMG	Severe Accident Management Guideline
SAR	Safety Analysis Report
SBO	station blackout
SEIS	Supplemental Environmental Impact Statement
SER	Safety Evaluation Report
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SO_x	sulfur oxide(s)
TBq	terabecquerel
UDB	urban development boundary
UFSAR	Updated Final Safety Analysis Report
U.S.	United States
USC	United States Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
yr	year

1.0 Introduction

Under the U.S. Nuclear Regulatory Commission's (NRC's) environmental protection regulations in Title 10, Part 51 of the *Code of Federal Regulations* (10 CFR 51), which implement the National Environmental Policy Act (NEPA), renewal of a nuclear power plant operating license (OL) requires the preparation of an environmental impact statement (EIS). In preparing the EIS, the NRC staff is required first to issue the statement in draft form for public comment, and then issue a final statement after considering public comments on the draft. To support the preparation of the EIS, the staff has prepared a *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2 (NRC 1996; 1999).[a] The GEIS is intended to (1) provide an understanding of the types and severity of environmental impacts that may occur as a result of license renewal of nuclear power plants under 10 CFR Part 54, (2) identify and assess the impacts that are expected to be generic to license renewal, and (3) support 10 CFR Part 51 to define the number and scope of issues that need to be addressed by the applicants in plant-by-plant renewal proceedings. Use of the GEIS guides the preparation of complete plant-specific information in support of the OL renewal process.

The PPL Susquehanna, LLC (PPL) operates Susquehanna Steam Electric Station, Units 1 and 2 (SSES) in Northeastern Pennsylvania under OLs NPF-014 and NPF-022, which was issued by the NRC. These OLs will expire in July 2022 for Unit 1 and March 2024 for Unit 2. On September 13, 2006, PPL submitted an application to the NRC to renew the SSES Units 1 and 2 OLs for an additional 20 years under 10 CFR Part 54. PPL is a *licensee* for the purposes of its current OLs and an *applicant* for the renewal of the OLs. Pursuant to 10 CFR 54.23 and 51.53(c), PPL submitted an Environmental Report (ER; PPL 2006a) in which PPL analyzed the environmental impacts associated with the proposed license renewal action, considered alternatives to the proposed action, and evaluated mitigation measures for reducing adverse environmental effects.

This report is the plant-specific supplement to the GEIS (the supplemental EIS [SEIS]) for the PPL license renewal application. This SEIS is a supplement to the GEIS because it relies, in part, on the findings of the GEIS. The staff will also prepare a separate safety evaluation report in accordance with 10 CFR Part 54.

[a] The GEIS was originally issued in 1996. Addendum 1 to the GEIS was issued in 1999. Hereafter, all references to the "GEIS" include the GEIS and its Addendum 1.

1.1 Report Contents

The following sections of this introduction (1) describe the background for the preparation of this SEIS, including the development of the GEIS and the process used by the staff to assess the environmental impacts associated with license renewal, (2) describe the proposed Federal action to renew the SSES OLs, (3) discuss the purpose and need for the proposed action, and (4) present the status of PPL's compliance with environmental quality standards and requirements that have been imposed by Federal, State, regional, and local agencies that are responsible for environmental protection.

The ensuing chapters of this SEIS closely parallel the contents and organization of the GEIS. Chapter 2 describes the site, power plant, and interactions of the plant with the environment. Chapters 3 and 4, respectively, discuss the potential environmental impacts of plant refurbishment and plant operation during the renewal term. Chapter 5 contains an evaluation of potential environmental impacts of plant accidents and includes consideration of severe accident mitigation alternatives. Chapter 6 discusses the uranium fuel cycle and solid waste management. Chapter 7 discusses decommissioning, and Chapter 8 discusses alternatives to license renewal. Finally, Chapter 9 summarizes the findings of the preceding chapters and draws conclusions about the adverse impacts that cannot be avoided; the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and the irreversible or irretrievable commitment of resources. Chapter 9 also presents the staff's preliminary recommendation with respect to the proposed license renewal action.

Additional information is included in appendixes. Appendix A contains public comments related to the environmental review for license renewal and staff responses to those comments. Appendixes B through G, respectively, list the following:

- The preparers of the supplement,
- A chronology of NRC staff's environmental review correspondence related to this draft SEIS,
- The organizations contacted during the development of this draft SEIS,
- PPL's compliance status in Table E-1 (this appendix also contains copies of consultation correspondence prepared and sent during the evaluation process),
- GEIS environmental issues that are not applicable to SSES, and

- Severe accident mitigation alternatives (SAMAs).

1.2 Background

Use of the GEIS, which examines the possible environmental impacts that could occur as a result of renewing individual nuclear power plant OLs under 10 CFR Part 54, and the established license renewal evaluation process supports the thorough evaluation of the impacts of renewal of OLs.

1.2.1 Generic Environmental Impact Statement

The NRC initiated a generic assessment of the environmental impacts associated with the license renewal term to improve the efficiency of the license renewal process by documenting the assessment results and codifying the results in the Commission's regulations. This assessment is provided in the GEIS, which serves as the principal reference for all nuclear power plant license renewal EISs.

The GEIS documents the results of the systematic approach that was taken to evaluate the environmental consequences of renewing the licenses of individual nuclear power plants and operating them for an additional 20 years. For each potential environmental issue, the GEIS (1) describes the activity that affects the environment, (2) identifies the population or resource that is affected, (3) assesses the nature and magnitude of the impact on the affected population or resource, (4) characterizes the significance of the effect for both beneficial and adverse effects, (5) determines whether the results of the analysis apply to all plants, and (6) considers whether additional mitigation measures would be warranted for impacts that would have the same significance level for all plants.

The NRC's standard of significance for impacts was established using the Council on Environmental Quality (CEQ) terminology for "significantly" (40 CFR 1508.27, which requires consideration of both "context" and "intensity.") Using the CEQ terminology, the NRC established three significance levels-SMALL, MODERATE, or LARGE. The definitions of the three significance levels are set forth in the footnotes to Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, as follows:

SMALL - Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE - Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

LARGE - Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

The GEIS assigns a significance level to each environmental issue, assuming that ongoing mitigation measures would continue.

The GEIS includes a determination of whether the analysis of the environmental issue could be applied to all plants and whether additional mitigation measures would be warranted. Issues are assigned a Category 1 or a Category 2 designation. As set forth in the GEIS, Category 1 issues are those that meet all of the following criteria:

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

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

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

For issues that meet the three Category 1 criteria, no additional plant-specific analysis is required in this SEIS unless new and significant information is identified.

Category 2 issues are those that do not meet one or more of the criteria of Category 1, and therefore, additional plant-specific review for these issues is required.

In the GEIS, the staff assessed 92 environmental issues and determined that 69 qualified as Category 1 issues, 21 qualified as Category 2 issues, and 2 issues were not categorized. The latter two issues, environmental justice and chronic effects of electromagnetic fields, were not categorized. Environmental justice was not evaluated on a generic basis and must be addressed in a plant-specific supplement to the GEIS. Information on the chronic effects of electromagnetic fields was not conclusive at the time the GEIS was prepared.

Of the 92 issues, 11 are related only to refurbishment, 6 are related only to decommissioning, 67 apply only to operation during the renewal term, and 8 apply to both refurbishment and operation during the renewal term. A summary of the findings for all 92 issues in the GEIS is codified in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B.

1.2.2 License Renewal Evaluation Process

An applicant seeking to renew its OLs is required to submit an ER as part of its application. The license renewal evaluation process involves careful review of the applicant's ER and assurance that all new and potentially significant information not already addressed in or available during the GEIS evaluation is identified, reviewed, and assessed to verify the environmental impacts of the proposed license renewal.

In accordance with 10 CFR 51.53(c)(2) and (3), the ER submitted by the applicant must

- provide an analysis of the Category 2 issues in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B in accordance with 10 CFR 51.53(c)(3)(ii)
- discuss actions to mitigate any adverse impacts associated with the proposed action and environmental impacts of alternatives to the proposed action.

In accordance with 10 CFR 51.53(c)(2), the ER does not need to

- consider the economic benefits and costs of the proposed action and alternatives to the proposed action except insofar as such benefits and costs are either (1) essential for making a determination regarding the inclusion of an alternative in the range of alternatives considered, or (2) relevant to mitigation
- consider the need for power and other issues not related to the environmental effects of the proposed action and the alternatives
- discuss any aspect of the storage of spent fuel within the scope of the generic determination in 10 CFR 51.23(a) in accordance with 10 CFR 51.23(b)
- contain an analysis of any Category 1 issue unless there is significant new information on a specific issue--this is pursuant to 10 CFR 51.23(c)(3)(iii) and (iv).

New and significant information is (1) information that identifies a significant environmental issue not covered in the GEIS and codified in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, or (2) information that was not considered in the analyses summarized in the GEIS and that leads to an impact finding that is different from the finding presented in the GEIS and codified in 10 CFR Part 51.

In preparing to submit its application to renew the SSES OLs, PPL developed a process to ensure that information not addressed in or available during the GEIS evaluation regarding the environmental impacts of license renewal for SSES would be properly reviewed before submitting the ER, and to ensure that such new and potentially significant information related to renewal of the licenses for SSES would be identified, reviewed, and assessed during the period

of NRC review. PPL reviewed the Category 1 issues that appear in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, to verify that the conclusions of the GEIS remained valid with respect to SSES. This review was performed by personnel from PPL and its support organization who were familiar with NEPA issues and the scientific disciplines involved in the preparation of a license renewal ER.

The NRC staff also has a process for identifying new and significant information. That process is described in detail in *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal* (ESRP), NUREG-1555, Supplement 1 (NRC 2006a). The search for new information includes (1) review of an applicant's ER and the process for discovering and evaluating the significance of new information; (2) review of records of public comments; (3) review of environmental quality standards and regulations; (4) coordination with Federal, State, and local environmental protection and resource agencies; and (5) review of the technical literature. New information discovered by the staff is evaluated for significance using the criteria set forth in the GEIS. For Category 1 issues where new and significant information is identified, reconsideration of the conclusions for those issues is limited in scope to the assessment of the relevant new and significant information; the scope of the assessment does not include other facets of the issue that are not affected by the new information.

Chapters 3 through 7 discuss the environmental issues considered in the GEIS that are applicable to SSES. At the beginning of the discussion of each set of issues, there is a table that identifies the issues to be addressed and lists the sections in the GEIS where the issue is discussed. Category 1 and Category 2 issues are listed in separate tables. For Category 1 issues for which there is no new and significant information, the table is followed by a set of short paragraphs that state the GEIS conclusion codified in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, followed by the staff's analysis and conclusion. For Category 2 issues, in addition to the list of GEIS sections where the issue is discussed, the tables list the subparagraph of 10 CFR 51.53(c)(3)(ii) that describes the analysis required and the draft SEIS sections where the analysis is presented. The draft SEIS sections that discuss the Category 2 issues are presented immediately following the table.

The NRC prepares an independent analysis of the environmental impacts of license renewal and compares these impacts with the environmental impacts of alternatives. The evaluation of the PPL license renewal application began with publication of a notice of acceptance for docketing of the Application, notice of opportunity for hearing and notice of intent to prepare an EIS and conduct scoping (71 FR 64566 [NRC 2006b]) on November 2, 2006. Two public scoping meetings were held on November 15, 2006 in Berwick Pennsylvania. Comments received during the scoping period were summarized in the *Environmental Impact Statement Scoping Process: Summary Report - SSES* (NRC 2007) dated April 2007. Comments that are applicable to this environmental review are presented in Part 1 of Appendix A.

The staff followed the review guidance contained in NUREG-1555, Supplement 1 (NRC 2000a). The staff and contractors retained to assist the staff visited the SSES site on August 2006, to gather information and to become familiar with the site and its environs. The staff also

reviewed the comments received during scoping, and consulted with Federal, State, regional, and local agencies. A list of the organizations consulted is provided in Appendix D. Other documents related to SSES were reviewed and are referenced.

This SEIS presents the staff's analysis that considers and weighs the environmental effects of the proposed renewal of the OLs for SSES, the environmental impacts of alternatives to license renewal, and mitigation measures available for avoiding adverse environmental effects. Chapter 9, "Summary and Conclusions," provides the NRC staff's preliminary recommendation to the Commission on whether or not the adverse environmental impacts of license renewal are so great that preserving the option of license renewal for energy-planning decisionmakers would be unreasonable.

A 75-day comment period will begin on the date of publication of the U.S. Environmental Protection Agency Notice of Filing of the draft SEIS to allow members of the public to comment on the preliminary results of the NRC staff's review. During this comment period, two public meetings will be held in Berwick, Pennsylvania in March 2008. During these meetings, the staff will describe the preliminary results of the NRC environmental review and answer questions related to it to provide members of the public with information to assist them in formulating their comments.

1.3 The Proposed Federal Action

The proposed Federal action is renewal of the OLs for SSES. The SSES is located in northeastern Pennsylvania, with the nearest metropolitan area Wilkes-Barre 20 miles to the northeast; Allentown, 50 miles to the southeast; and Harrisburg, 70 miles southwest of the SSES site. The plant has two Siemens-Westinghouse-designed boiling-water reactors, each with a design power level of 3,952 megawatts thermal (MW[t]) and a net power output of 1,300 megawatts electric (MW[e]). Plant cooling is provided by a closed-cycle heat dissipation system that dissipates heat primarily to the air. Units 1 and 2 produces electricity to supply the needs of more than 13,000 homes. The current OL for Unit 1 expires on July 17, 2022, and for Unit 2 on March 23, 2044. By letter dated September 13, 2006, PPL submitted an application to the NRC (PPL 2006b) to renew these OLs for an additional 20 years of operation (i.e., until July 17, 2044, for Unit 1 and March 23, 2064, for Unit 2).

1.4 The Purpose and Need for the Proposed Action

Although a licensee must have a renewed license to operate a reactor beyond the term of the existing OL, the possession of that license is just one of a number of conditions that must be met for the licensee to continue plant operation during the term of the renewed license. Once an OL is renewed, State regulatory agencies and the owners of the plant will ultimately decide whether the plant will continue to operate based on factors such as the need for power or other matters within the State's jurisdiction or the purview of the owners.

Thus, for license renewal reviews, the NRC has adopted the following definition of purpose and need (GEIS Section 1.3):

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

This definition of purpose and need reflects the Commission's recognition that, unless there are findings in the safety review required by the Atomic Energy Act of 1954 or findings in the NEPA environmental analysis that would lead the NRC to reject a license renewal application, the NRC does not have a role in the energy-planning decisions of State regulators and utility officials as to whether a particular nuclear power plant should continue to operate. From the perspective of the licensee and the State regulatory authority, the purpose of renewing an OL is to maintain the availability of the nuclear plant to meet system energy requirements beyond the current term of the plant's license.

1.5 Compliance and Consultations

PPL is required to hold certain Federal, State, and local environmental permits, as well as meet relevant Federal and State statutory requirements. In its ER, PPL provided a list of the authorizations from Federal, State, and local authorities for current operations as well as environmental approvals and consultations associated with SSES license renewal. Authorizations and consultations relevant to the proposed OL renewal action are included in Appendix E. [NOTE: FWS/NMFS consultation, NHPA consultation.]

The staff has reviewed the list and consulted with the appropriate Federal, State, and local agencies to identify any compliance or permit issues or significant environmental issues of concern to the reviewing agencies. These agencies did not identify any new and significant environmental issues. The ER states that PPL is in compliance with applicable environmental standards and requirements for SSES. The staff has not identified any environmental issues that are both new and significant.

1.6 References

10 CFR 51. Code of Federal Regulations, Title 10, *Energy,* Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

10 CFR 54. Code of Federal Regulations, Title 10, *Energy,* Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants."

40 CFR 1508. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 1508, "Terminology and Index."

Atomic Energy Act of 1954 (AEA). 42 USC 2011, et seq.

National Environmental Policy Act of 1969 (NEPA). 42 USC 4321, et seq.

PPL Susquehanna, LLC (PPL). 2006. *Applicant's Environmental Report - Operating License Renewal Stage Susquehanna Steam Electric Station 1 and 1.* Allentown, Pennsylvania. September.

U.S. Atomic Energy Commission (AEC). 1973. *Final Environmental Statement Related to Construction of Susquehanna Steam Electric Station, Units 1 and 2.* Pennsylvania Power and Light Company. Docket Nos. 50-387 and 50-388. Washington, D.C. June.

U.S. Nuclear Regulatory Commission (NRC). 1981. *Final Environmental Statement related to the Operation of Susquehanna Steam Electric Station.* Pennsylvania Power and Light Company and Allegheny Electric Cooperative, Inc. Dockets Nos. 50-387 and 50-388. Washington, D.C. June.

U.S. Nuclear Regulatory Commission (NRC). 1996. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants.* NUREG-1437, Volumes 1 and 2, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1999. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants Main Report*, "Section 6.3 - Transportation, Table 9.1, Summary of findings on NEPA issues for license renewal of nuclear power plants, Final Report." NUREG-1437, Volume 1, Addendum 1, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 2000a. *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal.* NUREG-1555, Supplement 1, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 2006x. Notice of Receipt and Availability of Application for Renewal of Susquehanna Steam Electric Station, Units 1 and 2 Facility Operating License Nos. NPF-14 and NPF-22 for an Additional 20 year period. Federal Register: Vol 71, No. 190 p. 58014. October 2, 2006.

U.S. Nuclear Regulatory Commission (NRC). 2006x. "*Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process.*" Federal Register: Vol. 71, No. 212, pp. 664566-64568. November 2, 2006.

U.S. Nuclear Regulatory Commission (NRC). *2007. Environmental Impact Statement Scoping Process: Summary Report - Susquehanna Steam Electric Station Units 1 & 2, Berwick, Pennsylvania.* Washington, D.C. April.

2.0 Description of Nuclear Power Plant and Site and Plant Interaction with the Environment

The Susquehanna Steam Electric Station, Units 1 and 2 (SSES) Plant is located in Salem Township, Luzerne County, Pennsylvania, along the Susquehanna River. The plant consists of two boiling water reactors that produce steam that turns turbines to generate electricity. SSES utilizes a closed-cycle heat dissipation system designed to remove waste heat from the circulating waster system via two natural draft cooling towers. The SSES facilities and infrastructure includes the 500-kilovolt (kV) switchyard, concrete reactor building, an independent spent fuel storage installation for dry storage, natural draft cooling towers, river intake structure, a submerged discharge structure/diffuser, outfall structure, an 8-acre lined concrete spray pond, control structure, turbine building, sewage treatment plant, learning center, meteorological tower and an environmental lab. The plant and its environs are described in Section 2.1, and the plant's interaction with the environment is presented in Section 2.2.

2.1 Plant and Site Description and Proposed Plant Operation During the Renewal Term

[Review recent SEISs for similar reactors for guidance on contents of the following sections.]

Figure 2-1. Location of SSES, 80-km (50-mi) Region

Figure 2-2. Location of SSES, 10-km (6-mi) Region

2.1.1 External Appearance and Setting

2.1.2 Reactor Systems

Figure 2-3. SSES Area Map

2.1.3 Cooling and Auxiliary Water Systems

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Figure 2-4. SSES Closed-Cycle Heat Dissipation System

2.1.4 Radioactive Waste Management Systems and Effluent Control Systems

2.1.4.1 Liquid Waste Processing Systems and Effluent Controls

2.1.4.2 Gaseous Waste Processing Systems and Effluent Controls

2.1.4.3 Solid Waste Processing

2.1.5 Nonradioactive Waste Systems

2.1.6 Plant Operation and Maintenance

2.1.7 Power Transmission System

Figure 2-5. SSES Transmission Lines

[Note that the there has been a tendency to use right-of-way or rights-of-way instead of corridor in recent SEISs. Be consistent in terminology.]

Table 2-1. SSES Transmission Line Corridors

Substation	Number of Lines	kV	Approximate Distance		Corridor	Corridor Width		Corridor Area
			km	(mi)		m	(ft)	hectares (acres)

Source: PPL 2000a.

2.2 Plant Interaction with the Environment

Sections 2.2.1 through 2.2.8 provide general descriptions of the environment near SSES as background information. They also provide detailed descriptions where needed to support the analysis of potential environmental impacts of refurbishment and operation during the renewal term, as discussed in Chapters 3 and 4. Section 2.2.9 describes the historic and archaeological resources in the area, and Section 2.2.10 describes possible impacts associated with other Federal project activities.

2.2.1 Land Use

[Include a paragraph on the Coastal Zone Management Act consistency certification, if applicable to the site.]

2.2.2 Water Use

2.2.3 Water Quality

2.2.4 Air Quality

[This section should include general climate information, climate information related to wind and solar energy, and air quality information. The air quality information should include identification of AQCR that includes the site, nearby AQCRs, attainment status, Air Quality Index (if available), closest Class I regions, routine releases at the site, and local regulations covering those releases.]

2.2.5 Aquatic Resources

[See guidance prepared by Goodman and Keto on preparation of the aquatic and terrestrial resources sections. This guidance covers both content and order of presentation.]

Table 2-2. Federally-Listed and Pennsylvania State-Listed Aquatic Species Potentially Occurring in the Vicinity of SSES and Associated Transmission Lines

Scientific Name	Common Name	Federal Status[a]	State Status[a]

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(a) E = endangered, T = threatened, T(S/A) = threatened due to similarity of appearance, C = candidate for federal listing, S = Pennsylvania species of special concern, -- = no listing.

2.2.6 Terrestrial Resources

[See guidance prepared by Goodman and Keto on preparation of the aquatic and terrestrial resources sections. This guidance covers both content and order of presentation.]

Table 2-3. Federally-Listed and Florida State-Listed Terrestrial Species Potentially Occurring in the Vicinity of SSES and Associated Transmission Lines

Scientific Name	Common Name	Federal Status[a]	State Status[a]
Reptiles			
Birds			
Mammals			
Insects			
Plants			

(a) E = endangered, T = threatened, T(S/A) = threatened due to similarity of appearance, C = candidate for Federal listing, S =Pennsylvania species of special concern.

Sources: Based on FWS http://(fish and wildlife site) and FNAI http://www.fnai.org Internet Sites as of Month/Year, and FGDL 2000.

2.2.7 Radiological Impacts

2.2.8 Socioeconomic Factors

2.2.8.1 Housing

Table 2-4. SSES Permanent Employee Residence Information by County and City

County and City[a]	PPL Employees
Luzerne County	
Total Luzerne County	
Columbia County	
Total Columbia County	
Other County	
Total Other County	
Other Counties	
Grand Total	

[a] Addresses are for both unincorporated (counties) and incorporated (cities and towns) areas.
Source: NRC 2007.

Table 2-5. Housing Units and Housing Units Vacant (Available) by County During 1990 and 2000

1980	1990	Approximate Percentage Change
Luzerne County		
Housing Units		
Occupied Units		
Vacant Units		
Columbia County		
Housing Units		
Occupied Units		
Vacant Units		
Other County		
Housing Units		

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Occupied Units	
Vacant Units	

(a) Values are the same due to rounding to the nearest thousands.
Sources: GEOSTAT 2001a and GEOSTAT 2001b.

2.2.8.2 Public Services

Water Supply

Table 2-6. Major Public Water Supply Systems in Luzerne County in December 1999

Water System	Source	Maximum Daily Capacity m3/s (ft3/s)	Average Daily Capacity m3/s (ft3/s)	Area Served
Other				

Source: Luzerne County 2000a.

Education

Transportation

2.2.8.3 Offsite Land Use

Table 2-7. Land Use in Luzerne, Year

Land Use	Hectares	Acres	Percent of Total
Residential			
Commercial			
Industrial			
Institutional			
Recreation			
Transportation and utilities			
Agriculture			
Open lands designated for environmental protection and not available for development			
Open lands available for development			
Water			
Total			

Source: USAF 2000.

2.2.8.4 Visual Aesthetics and Noise

2.2.8.5 Demography

Table 2-8. Population Growth in Luzerne and Columbia Counties Pennsylvania, Year to Year

Luzerne County			Columbia County		Other County	
	Population	Annual Growth Percent[(a)]	Population	Annual Growth Percent	Population	Annual Growth Percent
1970						
1980						
1990						
2000						
2010						

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2020

(a) Annual percent growth rate is calculated over the previous decade.
-- = No data available.

Sources: Pennsylvania Legislature 2001a (population for the years 1970 to 1990 and 2010); PPL 2000a (population projections for 2020); and U.S. Census Bureau (USCB) 2001a (populations for year 2000 that are actual accounts from the 2000 census).

Transient Population

Table 2-9. Major Employment Facilities Within 16 km (10 mi) of the SSES

Firm	Number of Employees

Source: PPL 1999b and USAF 2000.

Migrant Farm Labor

2.2.8.6 Economy

Table 2-10. SSES Contribution to County Property Tax Revenues and Operating Budget

Year	Total Luzerne County Property Tax Revenues ($)	*Property Tax Paid to Luzerne County for SSES* ($)	Percent of Total Property Taxes
1995			
1996			
1997			
1998			

Source: PPL 2000a.

2.2.9 Historic and Archaeological Resources

This section discusses the cultural background and the known historic and archaeological resources at the site of SSES and in the surrounding area.

2.2.9.1 Cultural Background

2.2.9.2 Historic and Archaeological Resources at SSES

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2.2.10 Related Federal Project Activities and Consultations

The staff reviewed the possibility that activities of other Federal agencies might impact the renewal of the OLs for SSES. Any such activities could result in cumulative environmental impacts and the possible need for the Federal agency to become a cooperating agency for preparation of the SEIS.

Describe the results of the review... a listing agencies and activities identified.

NRC is required under Section 102(c) of the National Environmental Policy Act of 1969 to consult with and obtain the comments of any Federal agency that has jurisdiction by law or special expertise with respect to any environmental impact involved. NRC consulted with the Fish and Wildlife Service (FWS), Susquehanna River Basin Commission (SRBC). Consultation correspondence is included in Appendix E.

2.3 References (Verify)

10 CFR 20. Code of Federal Regulations, Title 10, *Energy*, Part 20, "Standards for Protection Against Radiation."

10 CFR 50. Code of Federal Regulations, Title 10, *Energy*, Part 50, "Domestic Licensing of Production and Utilization Facilities."

10 CFR 54. Code of Federal Regulations, Title 10, *Energy,* Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants."

10 CFR 61. Code of Federal Regulations, Title 10, *Energy*, Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste."

10 CFR 71. Code of Federal Regulations, Title 10, *Energy*, Part 71, "Packaging and Transportation of Radioactive Material."

40 CFR 81. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 81, "Designation of Areas for Air Quality Planning Purposes."

40 CFR 190. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations."

Coastal Zone Management Act (CZMA). 16 USC 1451, et seq.

Endangered Species Act (ESA). 16 USC 1531, et seq.

National Environmental Policy Act of 1969 (NEPA). 42 USC 4321, et. seq.

Susquehanna River Basin Commission. 2006. Susquehanna River Basin Commission Information Sheet. Found at www.srbc.net. November.

U.S. Atomic Energy Commission (AEC). 1973. *Final Environmental Statement Related to Construction of Susquehanna Steam Electric Station, Units 1 and 2.* Pennsylvania Power and Light Company. Docket Nos. 50-387 and 50-388. Washington, D.C. June.

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Available URL: http://www.census.gov/population/cencounts/pa190090.tx. (Accessed July 22, 2004)

U.S. Census Bureau (USCB). 2000a. "Pennsylvania Quickfacts: Luzerne County." Available URL: http://quickfacts.census.gov/. (Accessed July 22, 2004)

U.S. Census Bureau (USCB). 2000a. "Pennsylvania Quickfacts: Columbia County." Available URL: http://quickfacts.census.gov/. (Accessed July 22, 2004)

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U.S. Census Bureau (USCB). 2003b. Summary File 1. 2000 Census of Population and Housing. U.S. Department of Commerce. September.

U.S. Census Bureau (USCB). 2004. Summary File 3. 2000 Census of Population and Housing. U.S. Department of Commerce. March.

U.S. Department of the Interior. 2004. National Register Information System.
Available URL: http://www.nr.nps.gov/. (Accessed August 5 and 6, 2004)

U.S. Nuclear Regulatory Commission (NRC). 1996. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants.* NUREG-1437, Volumes 1 and 2, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1999. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Main Report*, "Section 6.3 - Transportation, Table 9.1, Summary of findings on NEPA issues for license renewal of nuclear power plants, Final Report." NUREG-1437, Volume 1, Addendum 1, Washington, D.C.

3.0 Environmental Impacts of Refurbishment

Environmental issues associated with refurbishment activities are discussed in the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2 (NRC 1996; 1999).[a] The GEIS includes a determination of whether the analysis of the environmental issues could be applied to all plants and whether additional mitigation measures would be warranted. Issues are then assigned a Category 1 or a Category 2 designation. As set forth in the GEIS, Category 1 issues are those that meet all of the following criteria:

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

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

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

For issues that meet the three Category 1 criteria, no additional plant-specific analysis is required in this SEIS unless new and significant information is identified.

Category 2 issues are those that do not meet one or more of the criteria for Category 1 and, therefore, additional plant-specific review of these issues is required.

License renewal actions may require refurbishment activities for the extended plant life. These actions may have an impact on the environment that requires evaluation, depending on the type of action and the plant-specific design. Environmental issues associated with refurbishment that were determined to be Category 1 issues are listed in Table 3-1.

Environmental issues related to refurbishment considered in the GEIS for which these conclusions could not be reached for all plants, or for specific classes of plants, are Category 2 issues. These are listed in Table 3-2.

Table 3-1. Category 1 Issues for Refurbishment Evaluation

ISSUE--10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections
Surface-Water Quality, Hydrology, and Use (for all plants)	
Impacts of refurbishment on surface-water quality	3.4.1
Impacts of refurbishment on surface-water use	3.4.1
Aquatic Ecology (for all plants)	
Refurbishment	3.5
Ground-Water Use and Quality	
Impacts of refurbishment on ground-water use and quality	3.4.2
Land Use	
Onsite Land Use	3.2
Human Health	
Radiation exposures to the public during refurbishment	3.8.1
Occupational radiation exposures during refurbishment	3.8.2
Socioeconomics	
Public services: public safety, social services, and tourism and recreation	3.7.4; 3.7.4.3; 3.7.4.4; 3.7.4.6
Aesthetic impacts (refurbishment)	3.7.8

Category 1 and Category 2 issues related to refurbishment that are not applicable to Susquehanna Steam Electric Station, Units 1 and 2 (SSES) because they are related to plant design features or site characteristics not found at SSES are listed in Appendix F.

The potential environmental effects of refurbishment actions would be identified, and the analysis would be summarized within this section, if such actions were planned. PPL Susquehanna, LLC (PPL) indicated that it has performed an evaluation of structures and components pursuant to Title 10, Part 54, Section 54.21, of the *Code of Federal Regulations* (10 CFR 54.21) to identify activities that are necessary to continue

Table 3-2. Category 2 Issues for Refurbishment Evaluation

ISSUE--10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections	10 CFR 51.53 (c)(3)(ii) Subparagraph
Terrestrial Resources		
Refurbishment impacts	3.6	E
Threatened or Endangered Species (for all plants)		
Threatened or endangered species	3.9	E
Air Quality		
Air quality during refurbishment (nonattainment and maintenance areas)	3.3	F
Socioeconomics		
Housing impacts	3.7.2	I
Public services: public utilities	3.7.4.5	I
Public services: education (refurbishment)	3.7.4.1	I
Offsite land use (refurbishment)	3.7.5	I
Public services, transportation	3.7.4.2	J
Historic and archaeological resources	3.7.7	K
Environmental Justice		
Environmental justice	Not addressed[(a)]	Not addressed[(a)]

[(a)] Guidance related to environmental justice was not in place at the time the GEIS and the associated revision to 10 CFR Part 51 were prepared. If an applicant plans to undertake refurbishment activities for license renewal, environmental justice must be addressed in the applicant's environmental report and the staff's environmental impact statement.

operation of SSES during the requested 20-year period of extended operation. These activities include replacement of certain components as well as new inspection activities and are described in the Environmental Report (ER; PPL 2006).

However, PPL stated that the replacement of these components and the additional inspection activities are within the bounds of normal plant component replacement and inspections; therefore, they are not expected to affect the environment outside the bounds of plant operations as evaluated in the final environmental statement (AEC 1973; NRC 1981). In addition, PPL's evaluation of structures and components as required by 10 CFR 54.21 did not identify any major plant refurbishment activities or modifications necessary to support the continued operation of SSES beyond the end of the existing operating licenses. Therefore, refurbishment is not considered in this draft supplemental environmental impact statement.

3.1 References (Verify)

10 CFR 51. Code of Federal Regulations, Title 10, *Energy,* Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

10 CFR 54. Code of Federal Regulations, Title 10, *Energy,* Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants."

PPL Susquehanna, LLC (PPL). 2006. *Applicant's Environmental Report - Operating License Renewal Stage Susquehanna Steam Electric Station 1 and 1.* Allentown, Pennsylvania. September.

U.S. Atomic Energy Commission (AEC). 1973. *Final Environmental Statement Related to Construction of Susquehanna Steam Electric Station, Units 1 and 2.* Pennsylvania Power and Light Company. Docket Nos. 50-387 and 50-388. Washington, D.C. June.

U.S. Nuclear Regulatory Commission (NRC). 1981. *Final Environmental Statement related to the Operation of Susquehanna Steam Electric Station.* Pennsylvania Power and Light Company and Allegheny Electric Cooperative, Inc. Dockets Nos. 50-387 and 50-388. Washington, D.C. June.

U.S. Nuclear Regulatory Commission (NRC). 1996. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants.* NUREG-1437, Volumes 1 and 2, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1999. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Main Report*, "Section 6.3 - Transportation, Table 9.1, Summary of findings on NEPA issues for license renewal of nuclear power plants, Final Report." NUREG-1437, Volume 1, Addendum 1, Washington, D.C.

4.0 Environmental Impacts of Operation

Environmental issues associated with operation of a nuclear power plant during the renewal term are discussed in the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2 (NRC 1996a; 1999a).[(a)] The GEIS includes a determination of whether the analysis of the environmental issues could be applied to all plants and whether additional mitigation measures would be warranted. Issues are then assigned a Category 1 or a Category 2 designation. As set forth in the GEIS, Category 1 issues are those that meet all of the following criteria:

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

(2) A single significance level (i.e., SMALL, MODERATE, OR LARGE) has been assigned to the impacts (except for collective off-site radiological impacts from the fuel cycle and from high-level waste and spent fuel disposal).

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

For issues that meet the three Category 1 criteria, no additional plant-specific analysis is required unless new and significant information is identified.

Category 2 issues are those that do not meet one or more of the criteria for Category 1, and therefore, additional plant-specific review of these issues is required.

This chapter addresses the issues related to operation during the renewal term that are listed in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B and are applicable to the Susquehanna Steam Electric Station, Units 1 and 2 (SSES). Section 4.1 addresses issues applicable to the SSES cooling system. Section 4.2 addresses issues related to transmission lines and on-site land use. Section 4.3 addresses the radiological impacts of normal operation, and Section 4.4 addresses issues related to the socioeconomic impacts of normal operation during the renewal term. Section 4.5 addresses issues related to groundwater use and quality, while Section 4.6 discusses the impacts of renewal-term operations on threatened and endangered species. Section 4.7 addresses potential new information that was raised during the scoping period and

(a) The GEIS was originally issued in 1996. Addendum 1 to the GEIS was issued in 1999. Hereafter, all references to the "GEIS" include the GEIS and its Addendum 1.

Section 4.8 discusses cumulative impacts. The results of the evaluation of environmental issues related to operation during the renewal term are summarized in Section 4.9. Finally, Section 4.10 lists the references for Chapter 4. Category 1 and Category 2 issues that are not applicable to SSES because they are related to plant design features or site characteristics not found at SSES are listed in Appendix F.

4.1 Cooling System

Category 1 issues in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, that are applicable to SSES cooling system operation during the renewal term are listed in Table 4-1. PPL Susquehanna, LLC (PPL) stated in its Environmental Report (ER; PPL 2006a) that it is not aware of any new and significant information associated with the renewal of the SSES operating licenses (OLs). The staff has not identified any new and significant information during its independent review of the PPL ER (PPL 2006a), the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts related to these issues beyond those discussed in the GEIS. For all of the issues, the staff concluded in the GEIS that the impacts are SMALL, and additional plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

A brief description of the staff's review and the GEIS conclusions, as codified in Table B-1, for each of these issues follows:

Table 4-1. Category 1 Issues Applicable to the Operation of the SSES Cooling System During the Renewal Term

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections
SURFACE WATER QUALITY, HYDROLOGY, AND USE (FOR ALL PLANTS)	
Altered current patterns at intake and discharge structures	4.2.1.2.1
Temperature effects on sediment transport capacity	4.2.1.2.3
Scouring caused by discharged cooling water	4.2.1.2.3
Eutrophication	4.2.1.2.3
Discharge of chlorine or other biocides	4.2.1.2.4
Discharge of sanitary wastes and minor chemical spills	4.2.1.2.4
Discharge of other metals in wastewater	4.2.1.2.4
AQUATIC ECOLOGY (FOR ALL PLANTS)	
Accumulation of contaminants in sediments or biota	4.2.1.2.4
Entrainment of phytoplankton and zooplankton	4.2.2.1.1
Cold shock	4.2.2.1.5

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections
Thermal plume barrier to migrating fish	4.2.2.1.6
Distribution of aquatic organisms	4.2.2.1.6
Premature emergence of aquatic insects	4.2.2.1.7
Gas supersaturation (gas bubble disease)	4.2.2.1.8
Low dissolved oxygen in the discharge	4.2.2.1.9
Losses from predation, parasitism, and disease among organisms exposed to sublethal stresses	4.2.2.1.10
Stimulation of nuisance organisms	4.2.2.1.11
AQUATIC ECOLOGY (FOR PLANTS WITH COOLING-TOWER-BASED HEAT DISSIPATION SYSTEMS)	
Entrainment of fish and shellfish in early life stages	4.3.3
Impingement of fish and shellfish	4.3.3
Heat shock	4.3.3
TERRESTRIAL RESOURCES	
Cooling tower impacts on crops and ornamental vegetation	4.3.4
Cooling tower impacts on native plants	4.3.5.1
Bird collisions with cooling towers	4.3.5.2
HUMAN HEALTH	
Microbiological organisms (occupational health)	4.3.6
Noise	4.3.7

- Altered current patterns at intake and discharge structures. Based on information in the GEIS, the Commission found that

  > Altered current patterns have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of altered current patterns at intake and discharge structures during the renewal term beyond those discussed in the GEIS.

- Temperature effects on sediment transport capacity. Based on information in the GEIS, the Commission found that

> These effects have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of temperature effects on sediment transport capacity during the renewal term beyond those discussed in the GEIS.

- Scouring caused by discharged cooling water. Based on information in the GEIS, the Commission found that

> Scouring has not been found to be a problem at most operating nuclear power plants and has caused only localized effects at a few plants. It is not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, its review of monitoring programs, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of scouring caused by discharged cooling water during the renewal term beyond those discussed in the GEIS.

- Eutrophication. Based on information in the GEIS, the Commission found that

> Eutrophication has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, its review of monitoring programs, or its evaluation of other available information including plant monitoring data and technical reports. Therefore, the staff concludes that there are no impacts of eutrophication during the renewal term beyond those discussed in the GEIS.

- Discharge of chlorine or other biocides. Based on information in the GEIS, the Commission found that

> Effects are not a concern among regulatory and resource agencies, and are not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information including the National Pollutant Discharge Elimination System (NPDES) permit for SSES, or discussion with the NPDES compliance office. Therefore, the staff concludes that there are no impacts of discharge of chlorine or other biocides during the renewal term beyond those discussed in the GEIS.

- Discharge of sanitary wastes and minor chemical spills. Based on information in the GEIS, the Commission found that

  > Effects are readily controlled through NPDES permit and periodic modifications, if needed, and are not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information including the NPDES permit for SSES, or discussion with the NPDES compliance office. Therefore, the staff concludes that there are no impacts of discharges of sanitary wastes and minor chemical spills during the renewal term beyond those discussed in the GEIS.

- Discharge of other metals in wastewater. Based on information in the GEIS, the Commission found that

  > These discharges have not been found to be a problem at operating nuclear power plants with cooling-tower-based heat dissipation systems and have been satisfactorily mitigated at other plants. They are not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information including the NPDES permit for SSES and the ecological risk assessment study for the closed-cycle heat dissipation system (ESE 2000), or discussion with the NPDES compliance office. Therefore, the staff concludes that there are no impacts of discharges of other metals in wastewater during the renewal term beyond those discussed in the GEIS.

- Accumulation of contaminants in sediments or biota. Based on information in the GEIS, the Commission found that

> Accumulation of contaminants has been a concern at a few nuclear power plants but has been satisfactorily mitigated by replacing copper alloy condenser tubes with those of another metal. It is not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of available information, including the ecological risk assessment for the closed-cycle heat dissipation system (ESE 2000). Therefore, the staff concludes that there are no impacts of accumulation of contaminants in sediments or biota during the renewal term beyond those discussed in the GEIS.

- Entrainment of phytoplankton and zooplankton. Based on information in the GEIS, the Commission found that

> Entrainment of phytoplankton and zooplankton has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, its review of monitoring programs, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of entrainment of phytoplankton and zooplankton during the renewal term beyond those discussed in the GEIS.

- Cold shock. Based on information in the GEIS, the Commission found that

> Cold shock has been satisfactorily mitigated at operating nuclear plants with once-through cooling systems, has not endangered fish populations or been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds, and is not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of cold shock during the renewal term beyond those discussed in the GEIS.

- Thermal plume barrier to migrating fish. Based on information in the GEIS, the Commission found that

> Thermal plumes have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of thermal plume barriers to migrating fish during the renewal term beyond those discussed in the GEIS.

- Distribution of aquatic organisms. Based on information in the GEIS, the Commission found that

> Thermal discharge may have localized effects but is not expected to effect the larger geographical distribution of aquatic organisms.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, its review of monitoring programs, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts on distribution of aquatic organisms during the renewal term beyond those discussed in the GEIS.

- Premature emergence of aquatic insects. Based on information in the GEIS, the Commission found that

> Premature emergence has been found to be a localized effect at some operating nuclear power plants but has not been a problem and is not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of premature emergence of aquatic insects during the renewal term beyond those discussed in the GEIS.

- Gas supersaturation (gas bubble disease). Based on information in the GEIS, the Commission found that

> Gas supersaturation was a concern at a small number of operating nuclear power plants with once-through cooling systems but has been satisfactorily mitigated. It has not been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds and is not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of gas supersaturation during the renewal term beyond those discussed in the GEIS.

- Low dissolved oxygen in the discharge. Based on information in the GEIS, the Commission found that

> Low dissolved oxygen has been a concern at one nuclear power plant with a once-through cooling system but has been effectively mitigated. It has not been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds and is not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, its review of monitoring programs, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of low dissolved oxygen during the renewal term beyond those discussed in the GEIS.

- Losses from predation, parasitism, and disease among organisms exposed to sublethal stresses. Based on information in the GEIS, the Commission found that

> These types of losses have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of losses from predation, parasitism, and disease among organisms exposed to sub-lethal stresses during the renewal term beyond those discussed in the GEIS.

- Stimulation of nuisance organisms. Based on information in the GEIS, the Commission found that

> Stimulation of nuisance organisms has been satisfactorily mitigated at the single nuclear power plant with a once-through cooling system where previously it was a problem. It has not been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds and is not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of stimulation of nuisance organisms during the renewal term beyond those discussed in the GEIS.

- Entrainment of fish and shellfish in early life stages (cooling-tower-based systems). Based on information in the GEIS, the Commission found that

> Entrainment of fish has not been found to be a problem at operating nuclear power plants with this type of cooling system and is not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of entrainment of fish and shell fish in early life stages for cooling-tower-based systems during the renewal term beyond those discussed in the GEIS.

- Impingement of fish and shellfish (cooling-tower-based systems). Based on information in the GEIS, the Commission found that

> The impingement has not been found to be a problem at operating nuclear power plants with this type of cooling system and is not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of impingement of fish and shell fish for cooling-tower-based systems during the renewal term beyond those discussed in the GEIS.

- Heat shock (cooling-tower-based systems). Based on information in the GEIS, the Commission found that

> Heat shock has not been found to be a problem at operating nuclear power plants with this type of cooling system and is not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of heat shock for cooling-tower-based systems during the renewal term beyond those discussed in the GEIS.

- Cooling tower impacts on crops and ornamental vegetation. Based on information in the GEIS, the Commission found that

> Impacts from salt drift, icing, fogging, or increased humidity associated with cooling tower operation have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no cooling tower impacts on crops and ornamental vegetation during the renewal term beyond those discussed in the GEIS.

- Cooling tower impacts on native vegetation. Based on information in the GEIS, the Commission found that

> Impacts from salt drift, icing, fogging, or increased humidity associated with cooling tower operation have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no cooling tower impacts on native vegetation during the renewal term beyond those discussed in the GEIS.

- Bird collisions with cooling towers. Based on information in the GEIS, the Commission found that

> These collisions have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of bird collisions with cooling towers during the renewal term beyond those discussed in the GEIS.

- Microbiological organisms (occupational health). Based on information in the GEIS, the Commission found that

> Occupational health impacts are expected to be controlled by continued application of accepted industrial hygiene practices to minimize worker exposures.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of microbiological organisms during the renewal term beyond those discussed in the GEIS.

- Noise. Based on information in the GEIS, the Commission found that

> Noise has not been found to be a problem at operating plants and is not expected to be a problem at any plant during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of noise during the renewal term beyond those discussed in the GEIS.

The Category 2 issues related to cooling system operation during the renewal term that are applicable to SSES are discussed in the sections that follow, and are listed in Table 4-2. Although the PPL ER identified only microbiological organisms (public health) as an applicable Category 2 issue, the staff determined that all the Category 2 issues pertaining to plants with cooling ponds are applicable to SSES.

Table 4-2. Category 2 Issues Applicable to the Operation of the SSES Cooling System During the Renewal Term

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections	10 CFR 51.53(c)(3)(ii) Subparagraph	SEIS Section
SURFACE WATER QUALITY, HYDROLOGY, AND USE (FOR ALL PLANTS)			
Water use conflicts (plants with cooling ponds or cooling towers using make-up water from a small river with low flow)	4.3.2.1; 4.4.2.1	A	4.1.1

4.1.1 Water Use Conflicts (Make-up Water from a Small River)

Insert a plant specific discussion of the issue. The discussion should end with a conclusion that the potential impacts are SMALL, MODERATE, or LARGE, and a statement about mitigation. In most cases there will be existing mitigation measures and these measures will continue. A statement such as the following would be appropriate:

> The staff has reviewed the available information including... Based on this information, the staff concludes that the potential impacts of ... are SMALL. During the course of its evaluation, the staff considered mitigation measures for continued operation of ... Based on this evaluation, the staff expects that mitigation measure in place at .... (e.g., ...) are appropriate and no additional mitigation measures are warranted.

4.2 Transmission Lines

The Final Environmental Statement for SSES (FES; AEC 1973) describes seven transmission lines that connect SSES with the transmission system. An additional transmission line was constructed in the early 1990s, and four other lines connect the Davis substation with other substations (Figure 2-5 and Table 2-1). These transmission corridors cover approximately 930 ha (2300 ac) over a total corridor length of approximately 92 km (57 mi). Tree trimming is normally only required at mid-span or when exotic species such as Australian pine invade the tower pads or corridor. Herbicides are used occasionally, primarily applied to individual trees or shrubs to prevent re-sprouting, although broadcast applications are used as general weed control in some of the urban or suburban areas. Regular mowing is also used for maintenance of corridors in suburban areas. PPL uses a computer database to prepare management

prescriptions for each section of transmission line corridor that incorporates known management concerns and environmental sensitivities.

Category 1 issues in 10 CFR Part 51, Subpart A, Appendix B, Table B-1 that are applicable to transmission lines from SSES are listed in Table 4-3. PPL stated in its ER that it is not aware of any new and significant information associated with the renewal of the SSES OLs. The staff has not identified any new and significant information during its independent review of the PPL ER (PPL 2006), the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts related to these issues beyond those discussed in the GEIS. For all of those issues, the staff concluded in the GEIS that the impacts are SMALL, and additional plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

A brief description of the staff's review and GEIS conclusions, as codified in Table B-1, for each of these issues follows:

Table 4-3. Category 1 Issues Applicable to the SSES Transmission Lines During the Renewal Term

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections
TERRESTRIAL RESOURCES	
Power line right-of-way management (cutting and herbicide application)	4.5.6.1
Bird collisions with power lines	4.5.6.2
Impacts of electromagnetic fields on flora and fauna (plants, agricultural crops, honeybees, wildlife, livestock)	4.5.6.3
Floodplains and wetland on power line right of way	4.5.7
AIR QUALITY	
Air quality effects of transmission lines	4.5.2
LAND USE	
Onsite land use	4.5.3
Power line right of way	4.5.3

- Power line right-of-way management (cutting and herbicide application). Based on information in the GEIS, the Commission found that

  The impacts of right-of-way maintenance on wildlife are expected to be of small significance at all sites.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, consultation with the U.S. Fish and Wildlife Service (FWS) and the, Pennsylvania Department of Conservation and Natural Resources (DCNR), or its evaluation of other information. Therefore, the staff concludes that there are no impacts of power line right-of-way maintenance during the renewal term beyond those discussed in the GEIS.

- Bird collisions with power lines. Based on information in the GEIS, the Commission found that

  > Impacts are expected to be of small significance at all sites.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, consultation with the FWS and DCNR, or its evaluation of other information. Therefore, the staff concludes that there are no impacts of bird collisions with power lines during the renewal term beyond those discussed in the GEIS.

- Impacts of electromagnetic fields on flora and fauna (plants, agricultural crops, honeybees, wildlife, livestock). Based on information in the GEIS, the Commission found that

  > No significant impacts of electromagnetic fields on terrestrial flora and fauna have been identified. Such effects are not expected to be a problem during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other information. Therefore, the staff concludes that there are no impacts of electromagnetic fields on flora and fauna during the renewal term beyond those discussed in the GEIS.

- Floodplains and wetland on power line right of way. Based on information in the GEIS, the Commission found that

  > Periodic vegetation control is necessary in forested wetlands underneath power lines and can be achieved with minimal damage to the wetland. No significant impact is expected at any nuclear power plant during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, consultation with the FWS and DCNR, or its evaluation of other information. Therefore, the staff concludes that there are no impacts of power line rights-of-way on floodplains and wetlands during the renewal term beyond those discussed in the GEIS.

- Air quality effects of transmission lines. Based on the information in the GEIS, the Commission found that

> Production of ozone and oxides of nitrogen is insignificant and does not contribute measurably to ambient levels of these gases.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other information. Therefore, the staff concludes that there are no air quality impacts of transmission lines during the renewal term beyond those discussed in the GEIS.

- Onsite land use. Based on the information in the GEIS, the Commission found that

> Projected onsite land use changes required during ... the renewal period would be a small fraction of any nuclear power plant site and would involve land that is controlled by the applicant.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other information. Therefore, the staff concludes that there are no onsite land use impacts during the renewal term beyond those discussed in the GEIS.

- Power line right of way. Based on information in the GEIS, the Commission found that

> Ongoing use of power line right of ways would continue with no change in restrictions. The effects of these restrictions are of small significance.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other information. Therefore, the staff concludes that there are no impacts of power line rights-of-way on land use during the renewal term beyond those discussed in the GEIS.

There is one Category 2 issue related to transmission lines, and another issue related to transmission lines is being treated as a Category 2 issue. These issues are listed in Table 4-4 and are discussed in Sections 4.2.1 and 4.2.2.

4.2.1 Electromagnetic Fields-Acute Effects

Based on the GEIS, the Commission found that electric shock resulting from direct access to energized conductors or from induced charges in metallic structures has not been found to be a problem at most operating plants and generally is not expected to be a problem during the

license renewal term. However, site-specific review is required to determine the significance of the electric shock potential along the portions of the transmission lines that are within the scope of this SEIS.

Table 4-4. Category 2 and Uncategorized Issues Applicable to the SSES Transmission Lines During the Renewal Term

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections	10 CFR 51.53(c)(3)(ii) Subparagraph	SEIS Section
HUMAN HEALTH			
Electromagnetic fields, acute effects (electric shock)	4.5.4.1	H	4.2.1
Electromagnetic fields, chronic effects	4.5.4.2	NA[(a)]	4.2.2

[(a)] NA = not addressed

In the GEIS (NRC 1996a), the staff found that without a review of the conformance of each nuclear plant transmission line with National Electrical Safety Code (NESC 1997) [Check for most recent date of the NESC and use this for your evaluation] criteria, it was not possible to determine the significance of the electric shock potential. Evaluation of individual plant transmission lines is necessary because the issue of electric shock safety was not addressed in the licensing process for some plants. For other plants, land use in the vicinity of transmission lines may have changed, or power distribution companies may have chosen to upgrade line voltage. To comply with 10 CFR 51.53(c)(3)(ii)(H), the applicant must provide an assessment of the potential shock hazard if the transmission lines that were constructed for the specific purpose of connecting the plant to the transmission system do not meet the recommendations of the NESC for preventing electric shock from induced currents.

[Insert a plant specific discussion of the issue. The discussion should end with a conclusion that the potential impacts are SMALL, MODERATE, or LARGE, and a statement about mitigation. In most cases there will be existing mitigation measures and these measures will continue. A statement such as the following would be appropriate:

> The staff has reviewed the available information including... Based on this information, the staff concludes that the potential impacts of ... are SMALL. During the course of its evaluation, the staff considered mitigation measures for continued operation of ... Based on this evaluation, the staff expects that mitigation measures in place at .... (e.g., ...) are appropriate and no additional mitigation measures are warranted.

4.2.2 Electromagnetic Fields-Chronic Effects

In the GEIS, the chronic effects of 60-Hz electromagnetic fields from power lines were not designated as Category 1 or 2, and will not be until a scientific consensus is reached on the health implications of these fields.

The potential for chronic effects from these fields continues to be studied and is not known at this time. The National Institute of Environmental Health Sciences (NIEHS) directs related research through the U.S. Department of Energy (DOE). A NIEHS report (NIEHS 1999) contains the following conclusion:

> The NIEHS concludes that ELF-EMF [extremely low frequency-electromagnetic field] exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern.

This statement is not sufficient to cause the staff to change its position with respect to the chronic effects of electromagnetic fields. Footnote 4 to Table B-1 states: "If in the future, the Commission finds that, contrary to current indications, a consensus has been reached by appropriate Federal health agencies that there are adverse health effects from electromagnetic fields, the Commission will require applicants to submit plant-specific reviews of those health effects as part of their license renewal applications. Until such time, applicants fro license renewal are not required to submit information on this issue." The staff considers the GEIS finding of "Uncertain" still appropriate and will continue to follow developments on this issue.

4.3 Radiological Impacts of Normal Operations

Category 1 issues in 10 CFR Part 51, Subpart A, Appendix B, Table B-1 that are applicable to SSES in regard to radiological impacts are listed in Table 4-5. SSES stated in its ER (PPL 2006a) that it is not aware of any new and significant information associated with the renewal of the SSES OLs. The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts related to these issues beyond those discussed in the GEIS. For these issues, the staff concluded in the GEIS that the impacts are SMALL, and additional plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

Table 4-5. Category 1 Issues Applicable to Radiological Impacts of Normal Operations During the Renewal Term

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections
HUMAN HEALTH	
Radiation exposures to public (license renewal term)	4.6.2
Occupational radiation exposures (license renewal term)	4.6.3

A brief description of the staff's review and the GEIS conclusions, as codified in Table B-1, for each of these issues follows:

- Radiation exposures to public (license renewal term). Based on information in the GEIS, the Commission found that

  > Radiation doses to the public will continue at current levels associated with normal operations.

  The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of radiation exposures to the public during the renewal term beyond those discussed in the GEIS.

- Occupational radiation exposures (license renewal term). Based on information in the GEIS, the Commission found that

  > Projected maximum occupational doses during the license renewal term are within the range of doses experienced during normal operations and normal maintenance outages, and would be well below regulatory limits.

  The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts of occupational radiation exposures during the renewal term beyond those discussed in the GEIS.

There are no Category 2 issues related to radiological impacts of routine operations. Or, Refer to Section 4.7 for an evaluation of potential new and significant radiological impacts on human health.

4.4 Socioeconomic Impacts of Plant Operations During the License Renewal Period

Category 1 issues in 10 CFR Part 51, Subpart A, Appendix B, Table B-1 that are applicable to socioeconomic impacts during the renewal term are listed in Table 4-6. PPL stated in its ER (PPL 2006a) that it is not aware of any new and significant information associated with the renewal of SSES OLs. The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts related to these issues beyond those discussed in the GEIS (NRC 1996a). For these issues, the staff concluded in the GEIS that the impacts are SMALL, and additional plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

Table 4-6. Category 1 Issues Applicable to Socioeconomics During the Renewal Term

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections
SOCIOECONOMICS	
Public services: public safety, social services, and tourism and recreation	4.7.3; 4.7.3.3; 4.7.3.4; 4.7.3.6
Public services: education (license renewal term)	4.7.3.1
Aesthetic impacts (license renewal term)	4.7.6
Aesthetic impacts of transmission lines (license renewal term)	4.5.8

A brief description of the staff's review and the GEIS conclusions, as codified in Table B-1, for each of these issues follows:

- Public services: public safety, social services, and tourism and recreation. Based on information in the GEIS, the Commission found that

  > Impacts to public safety, social services, and tourism and recreation are expected to be of small significance at all sites.

  The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts on public safety, social services, and tourism and recreation during the renewal term beyond those discussed in the GEIS.

- Public services: education (license renewal term). Based on information in the GEIS, the Commission found that

Only impacts of small significance are expected.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts on education during the renewal term beyond those discussed in the GEIS.

- Aesthetic impacts (license renewal term). Based on information in the GEIS, the Commission found that

  No significant impacts are expected during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no aesthetic impacts during the renewal term beyond those discussed in the GEIS.

- Aesthetic impacts of transmission lines (license renewal term). Based on information in the GEIS, the Commission found that

  No significant impacts are expected during the license renewal term.

The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no aesthetic impacts of transmission lines during the renewal term beyond those discussed in the GEIS.

Table 4-7 lists the Category 2 socioeconomic issues, which require plant-specific analysis, and environmental justice, which was not addressed in the GEIS.

Table 4-7. Environmental Justice and GEIS Category 2 Issues Applicable to Socioeconomics During the Renewal Term

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections	10 CFR 51.53(c)(3)(ii) Subparagraph	SEIS Section
	SOCIOECONOMICS		
Housing impacts	4.7.1	I	4.4.1
Public services: public utilities	4.7.3.5	I	4.4.2
Offsite land use (license renewal term)	4.7.4	I	4.4.3

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections	10 CFR 51.53(c)(3)(ii) Subparagraph	SEIS Section
Public Services, transportation	4.7.3.2	J	4.4.4
Historic and archaeological resources	4.7.7	K	4.4.5
Environmental Justice	Not addressed[a]	Not addressed[a]	4.4.6

[a] Guidance related to environmental justice was not in place at the time the GEIS and the associated revision to 10 CFR Part 51 were prepared. Therefore, environmental justice must be addressed in the staff's environmental impact statement.

4.4.1 Housing Impacts During Operations

In determining housing impacts, the applicant chose to follow Appendix C of the GEIS (NRC 1996a), which presents a population characterization method that is based on two factors, "sparseness" and "proximity" (GEIS Section C.1.4 [NRC 1996a]). Sparseness measures population density within 32 km (20 mi) of the site, and proximity measures population density and city size within 80 km (50 mi). Each factor has categories of density and size (GEIS Table C.1), and a matrix is used to rank the population category as low, medium, or high (GEIS Figure C.1).

Add site-specific discussion of population category.

10 CFR Part 51, Subpart A, Appendix B, Table B-1 states that impacts on housing availability are expected to be of small significance at plants located in a high-population area where growth-control measures are not in effect. The SSES site is located in a low-population area and Luzerne County is not subject to growth-control measures that would limit housing development. Based on the NRC criteria, PPL expects housing impacts to be SMALL during continued operations (PPL 2006a).

SMALL impacts result when no discernible change in housing availability occurs, changes in rental rates and housing values are similar to those occurring statewide, and no housing construction or conversion is required to meet new demand (NRC 1996a). The GEIS assumes that an additional staff of 60 permanent per unit workers might be needed during the license renewal period to perform routine maintenance and other activities.

Add site-specific discussion of impacts on housing

The staff reviewed the available information relative to housing impacts and PPL's conclusions. Based on this review, the staff concludes that the impact on housing during the license renewal period would be SMALL, and additional mitigation is not warranted.

4.4.2 Public Services: Public Utility Impacts During Operations

Impacts on public utility services are considered SMALL if there is little or no change in the ability of the system to respond to the level of demand, and thus there is no need to add capital facilities. Impacts are considered MODERATE if overtaxing of service capabilities occurs during periods of peak demand. Impacts are considered LARGE if existing levels of service (e.g., water or sewer services) are substantially degraded and additional capacity is needed to meet ongoing demands for services. The GEIS indicates that, in the absence of new and significant information to the contrary, the only impacts on public utilities that could be significant are impacts on public water supplies (NRC 1996a).

Analysis of impacts on the public water supply system considered both plant demand and plant-related population growth. Section 2.2.2 describes the SSES permitted withdrawal rate and actual use of water. ...

[Insert a plant specific discussion of the issue. The discussion should end with a conclusion that the potential impacts are SMALL, MODERATE, or LARGE, and a statement about mitigation. In most cases there will be existing mitigation measures and these measures will continue. A statement such as the following would be appropriate:

> The staff has reviewed the available information including... Based on this information, the staff concludes that the potential impacts of ... are SMALL. During the course of its evaluation, the staff considered mitigation measures for continued operation of ... Based on this evaluation, the staff expects that mitigation measure in place at .... (e.g., ...) are appropriate and no additional mitigation measures are warranted.]

4.4.3 Offsite Land Use During Operations

Offsite land use during the license renewal term is a Category 2 issue (10 CFR 51, Subpart A, Appendix B, Table B-1). Table B-1 of 10 CFR 51 Subpart A, Appendix B notes that "significant changes in land use may be associated with population and tax revenue changes resulting from license renewal."

Section 4.7.4 of the GEIS defines the magnitude of land-use changes as a result of plant operation during the license renewal term as follows:

> SMALL - Little new development and minimal changes to an area's land-use pattern.
>
> MODERATE - Considerable new development and some changes to the land-use pattern.
>
> LARGE - Large-scale new development and major changes in the land-use pattern.

Tax revenue can affect land use because it enables local jurisdictions to be able to provide the public services (e.g., transportation and utilities) necessary to support development. Section 4.7.4.1 of the GEIS states that the assessment of tax-driven land-use impacts during the license renewal term should consider (1) the size of the plant's payments relative to the community's total revenues, (2) the nature of the community's existing land-use pattern, and (3) the extent to which the community already has public services in place to support and guide development. If the plant's tax payments are projected to be small relative to the community's total revenue, tax-driven land-use changes during the plant's license renewal term would be SMALL, especially where the community has pre-established patterns of development and has provided adequate public services to support and guide development. Section 4.7.2.1 of the GEIS states that if tax payments by the plant owner are less than 10 percent of the taxing jurisdictions revenue, the significance level would be SMALL. If the plant's tax payments are projected to be medium to large relative to the community's total revenue, new tax-driven land-use changes would be MODERATE. If the plant's tax payments are projected to be a dominant source of the community's total revenue, new tax-driven land-use changes would be LARGE. This would be especially true where the community has no pre-established pattern of development or has not provided adequate public services to support and guide development.

Insert site-specific information and conclusions.

4.4.4 Public Services: Transportation Impacts During Operations

Table B-1, 10 CFR Part 51 states: "Transportation impacts (level of service) of highway traffic generated... during the term of the renewed license are generally expected to be of small significance. However, the increase in traffic associated with additional workers and the local road and traffic control conditions may lead to impacts of moderate or large significance at some sites." All applicants are required by 10 CFR 51.53(c)(3)(ii)(J) to assess the impacts of highway traffic generated by the proposed project on the level of service of local highways during the term of the renewed license.

Insert site-specific information and conclusions.

4.4.5 Historic and Archaeological Resources

The National Historic Preservation Act (NHPA) requires that Federal agencies take into account the effects of their undertakings on historic properties. The historic review process mandated by Section 106 of the NHPA is outlined in regulations issued by the Advisory Council on Historic

In accordance with USCB guidelines for the purpose of collecting and presenting decennial census data. Census block groups are subsets of census tracts (USCB 2005b).

Preservation at 36 CFR Part 800. Renewal of an OL is an undertaking that could potentially affect historic properties. Therefore, according to the NHPA, the NRC is to make a reasonable effort to identify historic properties in the areas of potential effects. If no historic properties are present or affected, the NRC is required to notify the State Historic Preservation Officer (SHPO) before proceeding. If it is determined that historic properties are present, the NRC is required to assess and resolve possible adverse effects of the undertaking.

Insert site-specific information and conclusions.

4.4.6 Environmental Justice

Environmental justice refers to a Federal policy that requires that Federal agencies identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its actions on minority[(a)] or low-income populations. The memorandum accompanying Executive Order 12898 (59 FR 7629) directs Federal executive agencies to consider environmental justice under the National Environmental Policy Act of 1969 (NEPA). The Council on Environmental Quality (CEQ) has provided guidance for addressing environmental justice (CEQ 1997). Although the Executive Order is not mandatory for independent agencies, the NRC has voluntarily committed to undertake environmental justice reviews. Specific guidance is provided in NRC Office of Nuclear Reactor Regulation Office Instruction LIC-203, Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues Rev. 1 (NRC 2004a). In 2004, the Commission issued a final *Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions* (NRC 2004b).

The scope of the review as defined in NRC guidance (NRC 2004a) includes identification of impacts on minority and low-income populations, the location and significance of any environmental impacts during operations on populations that are particularly sensitive, and information pertaining to mitigation. It also includes evaluation of whether these impacts are likely to be disproportionately high and adverse.

The staff looks for minority and low-income populations within the 80-km (50-mi) radius of the site. For the staff's review, a minority population exists in a census block group[(b)] if the percentage of each minority and aggregated minority category within the census block group exceeds the corresponding percentage of minorities in the state of which it is a part by 20

(a) The NRC guidance for performing environmental justice reviews defines "minority" as American Indian or Alaskan Native; Asian; Native Hawaiian or other Pacific Island; Black races; or Hispanic ethnicity. "Other" races and multiracial individuals may be considered as separate minorities (NRC 2004a).

(b) A Census block group is a combination of census blocks, which are statistical subdivisions of a census tract. A census block is the smallest geographic entity for which the U.S. Census Bureau (USCB) collects and tabulates decennial census information. A census tract is a small, relatively permanent statistical subdivision of counties delineated by local committees of census data users

percentage points, or the corresponding percentage of minorities within the census block group is at least 50 percent. A low-income population exists if the percentage of low-income population within a census block group exceeds the corresponding percentage of low-income population in the state of which it is a part by 20 percent, or if the corresponding percentage of low-income population within a census block group is at least 50 percent.

For the SSES review, the staff examined the geographic distribution of minority and low-income populations within 80 km (50 mi) of the site, employing the 1990 Census (USCB 1991) for low-income populations and the 2000 Census (USCB 2000) for minority populations. The analysis was supplemented by field inquiries to the planning department and social service agencies in Luzerne County.

Figures 4-1 and 4-2 show the distribution of census block groups for the minority and low-income populations, respectively.

Figure 4-1. Geographic Distribution of Minority Populations (shown in shaded areas) Within 80-km (50-mi) of SSES Based on Census Block Group Data[(a)]

Figure 4-2. Geographic Distribution of Low-Income Populations (shown in shaded areas) Within 80-km (50-mi) of the SSES Site Based on Census Block Group Data [(a)]

[Add site-specific discussion of distributions.]

With the locations of minority and low-income populations identified, the staff proceeded to evaluate whether any of the environmental impacts of the proposed action could affect these populations in a disproportionately high and adverse manner. Based on staff guidance (NRC 2001), air, land, and water resources within about 80 km (50 mi) of the SSES site were examined. Within that area, a few potential environmental impacts could affect human populations; all of these were considered SMALL for the general population.

The pathways through which the environmental impacts associated with SSES license renewal can affect human populations are discussed in each associated section. The staff evaluated whether minority and low-income populations could be disproportionately affected by these impacts. The staff found no unusual resource dependencies or practices, such as subsistence agriculture, hunting, or fishing through which the populations could be disproportionately high and adversely affected. In addition, the staff did not identify any location-dependent disproportionately high and adverse impacts affecting these minority and low-income populations. The staff concludes that offsite impacts from Turkey Point Units 3 and 4 to minority and low-income populations would be SMALL, and no special mitigation actions are warranted.

(a) In accordance with USCB guidelines for the purpose of collecting and presenting decennial census data. Census block groups are subsets of census tracts (USCB 2005b).

4.5 Ground-Water Use and Quality

Category 1 issues in 10 CFR Part 51, Subpart A, Appendix B, Table B-1 that are applicable to SSES groundwater use and quality are listed in Table 4-8. PPL stated in its ER that it is not aware of any new and significant information associated with the renewal of the SSES OLs (PPL 2006a). The staff has not identified any new and significant information during its independent review of the PPL ER (PPL 2006a), the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no impacts related to these issues beyond those discussed in the GEIS. For these issues, the GEIS concluded that the impacts are SMALL, and additional plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

A brief description of the staff's review and the GEIS conclusions, as codified in Table B-1, 10 CFR 51, follows.

Table 4-8. Category 1 Issues Applicable to Groundwater Use and Quality During the Renewal Term

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections
GROUND-WATER USE AND QUALITY	
Ground-water use conflicts (potable and service water; plants that use <100 gpm).	4.8.1.1

- Ground-water use conflicts (potable and service water; plants that use <100 gpm). Based on information in the GEIS, the Commission found that

  > Plants using less than 100 gpm are not expected to cause any ground-water use conflicts.

As discussed in Section 2.2.2, SSES groundwater use is less than 0.068 m^3/s (100 gpm). The staff has not identified any new and significant information during its independent review of the PPL ER, the staff's site visit, the scoping process, or its evaluation of other available information. Therefore, the staff concludes that there are no groundwater use conflicts during the renewal term beyond those discussed in the GEIS.

Category 2 issues related to groundwater use and quality during the renewal term that are applicable to SSES are discussed in the sections that follow. These issues, which require plant-specific analysis, are listed in Table 4-9.

Table 4-9. Category 2 Issues Applicable to Groundwater Use and Quality During the Renewal Term

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections	10 CFR 51.53(c)(3)(ii) Subparagraph	SEIS Section
GROUND-WATER USE AND QUALITY			
Ground-water use conflicts (plants using cooling towers withdrawing make-up water from a small river)	4.8.1.3 4.4.2.1	A	4.5.2

4.5.1 Ground-Water Use Conflicts (Make-up From a Small River)

[Insert a small discussion of the issue]

4.6 Threatened or Endangered Species

Threatened or endangered species are listed as a Category 2 issue in 10 CFR Part 51, Subpart A, Appendix B, Table B-1. This issue is listed in Table 4-10.

Table 4-10. Category 2 Issue Applicable to Threatened or Endangered Species During the Renewal Term

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Section	10 CFR 51.53(c)(3)(ii) Subparagraph	SEIS Section
THREATENED OR ENDANGERED SPECIES (FOR ALL PLANTS)			
Threatened or endangered species	4.1	E	4.6

This issue requires consultation with appropriate agencies to determine whether threatened or endangered species are present and whether they would be adversely affected by continued operation of the nuclear plant during the license renewal term. The presence of threatened or endangered species in the vicinity of the SSES site is discussed in Sections 2.2.5 and 2.2.6.

Add a discussion of consultation correspondence.

4.6.1 Aquatic Species

Insert a plant specific discussion of the issue. The discussion should end with a conclusion that the potential impacts are SMALL, MODERATE, or LARGE, and a statement about mitigation. In most cases there will be existing mitigation measures and these measures will continue. A statement such as the following would be appropriate:

The staff has reviewed the available information including... Based on this information, the staff concludes that the potential impacts of ... are SMALL. During the course of its evaluation, the staff considered mitigation measures for continued operation of ... Based on this evaluation, the staff expects that mitigation measure in place at .... (e.g., ...) are appropriate and no additional mitigation measures are warranted.

4.6.2 Terrestrial Species

[Insert a plant specific discussion of the issue. The discussion should end with a conclusion that the potential impacts are SMALL, MODERATE, or LARGE, and a statement about mitigation. In most cases there will be existing mitigation measures and these measures will continue. A statement such as the following would be appropriate:

The staff has reviewed the available information including... Based on this information, the staff concludes that the potential impacts of ... are SMALL. During the course of its evaluation, the staff considered mitigation measures for continued operation of ... Based on this evaluation, the staff expects that mitigation measure in place at .... (e.g., ...) are appropriate and no additional mitigation measures are warranted.]

4.7 Evaluation of New and Potentially Significant Information on Impacts of Operations During the Renewal Term (Contractor Input)

The staff has not identified new and significant information on environmental issues listed in 10 CFR Part 51, Subpart A, Appendix B, Table B-1, related to operation during the renewal term. The staff also determined that information provided during the public comment period did not identify any new issue that requires site-specific assessment. The staff reviewed the discussion of environmental impacts associated with operation during the renewal term in the GEIS and has conducted its own independent review, including public scoping meetings, to identify issues with new and significant information. Processes for identification and evaluation of new information are described in Section 1.2.2.

Or

During the scoping period, comments indicated concern about the health effects from exposure to radiation from SSES, the noise and aesthetic impacts of these SSES units on National Park visitors, and the plant's ability to withstand severe weather. These issues are discussed in the following sections.

4.7.1 Evaluation of New and Potentially Significant Information on Radiological Impacts on Human Health

4.7.2 Evaluation of SSES Point Noise and Aesthetic Impacts

4.7.3 Evaluation of New and Potentially Significant Plant Design Information

Other possible sections include dredging, shoreline erosion, and stimulation of nuisance organisms or plants. Check if these need to be addressed until the time of the GEIS Update, which should include these ideas.

The discussion of new issues found not to be significant should conclude with a statement similar to the following.

On the basis of this information, the staff concludes that although continued disposal of wastewater to onsite absorption ponds and sewage lagoons during the license renewal period is considered a new issue, the impact to groundwater quality that would result would be SMALL and, therefore, not significant. Further mitigation is not warranted.

4.8 Cumulative Impacts

In this section, address the impacts on the environment that result from the incremental impacts of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes these other actions.

Focus on effects that are truly meaningful. An example to commonly include would be impacts on aquatic species in the cooling water resource (lake or river) if there are other human activities affecting those same resources. An example of something that can be excluded would be the impacts on air quality of the small emissions sources at a nuclear plant located in an area that is in attainment. For license renewal reviews, impacts to aquatic species and other water quality issues, and human health impacts, are the areas that will most likely be of importance. But other areas (e.g., terrestrial resources, socioeconomics) can also be important.

When looking at cumulative effects, it is usually best to look at it from the perspective of the affected resource (do the review from the resource UP). So, for example, if you're looking at impacts to a fish species in a river, you should consider activities that are impacting that species within the spawning and migratory range of the fish in that part of the river. What is impacting the river and the fish- the license renewal of this power plant, perhaps another plant

being built or currently operating on the same water body, periodic dredging? Make sure your geographic area and time periods are defined broadly enough!

The results of your review should be organized by the type of resource affected (e.g., aquatic, terrestrial, water body, land use).
The format is as follows:
Define geographic area and time period, define past actions, define present actions (baseline condition of the environment), define reasonably foreseeable future actions.]

The staff considered potential cumulative impacts on the environment resulting from the incremental impact of license renewal when added to other past, present, and reasonably foreseeable future actions. For the purposes of this analysis, past actions are those related to the resources at the time of the power plant licensing and construction, present actions are those related to the resources at the time of current operation of the power plant, and future actions are considered to be those that are reasonably foreseeable through the end of plant operation including the 20-year license renewal term. The geographic area over which past, present, and future actions are assessed is dependent on the affected resource.

The impacts of the proposed action, as described in Section 4, are combined with other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. These combined impacts are defined as "cumulative" in 40 CFR 1508.7 and include individually minor but collectively significant actions taking place over a period of time. It is possible that an impact that may be SMALL by itself could result in a MODERATE or LARGE impact when considered in combination with the impacts of other actions on the affected resource. Likewise, if a resource is regionally declining or imperiled, even a SMALL individual impact could be important if it contributes to or accelerates the overall resource decline.

The following impacts were analyzed and found not to contribute to cumulative impacts: emissions sources at the nuclear plant in an attainment area, historic and archeological impacts? [add more here or delete if not applicable].

4.8.1 Cumulative Impacts (Will be determined once chapter 4 and new and significant review is completed)

[Address the following issues in this section:
- surface water quality,
- surface water use,
- discharges, surface runoff, nutrient loading
- biocides,
- consumptive use/evaporative loss,

• dredging,
• beach erosion or beach closure,
• recreational impacts,
• aquatic ecology impacts on population and ecosystem,
• impingement/entrainment
• aquatic habitat]

4.8.2 Cumulative Impacts on Terrestrial Resources

[Address the following issues in this section:
• Transmission Line ROW maintenance activities impact on vegetation,
• Transmission Line ROW maintenance impacts on T+E species habitats (both aquatic (if stream crossing) and terrestrial),
• impacts to terrestrial resources (e.g., wildlife populations, the size and distribution of habitat areas collisions with deer due to increased vehicle traffic on roads from development in the site vicinity)
• refurbishment or land-disturbing activities on plant site or Transmission Lines ROWs]

4.8.3 Cumulative Human Health Impacts

[Address the following issues in this section:

4.8.3.1 Radiological Impacts (*either address this here or categorize as having no cumulative impacts in summary statement above and in 4.8.6*)
• radiological environmental monitoring program (REMP) ,
• public and workers (occupational) dose,
• address any other nearby nuclear facilities (Three Mile Island, Beaver Valley, Limerick, Peach Bottom),
• mention that NRC and State will regulate future activities' radiological impacts,

4.8.3.2 Electromagnetic Impacts
• Electric Shock from Transmission Lines, electromagnetic impacts]

4.8.4 Cumulative Socioeconomic Impacts

[Address the following issues in this section:
• Address future County plans,
• Address population increases in the area,
• public services, housing, and offsite land use from Section 4.4,

[• Historic and Archeological Resources (*either address this here or categorize as having no cumulative impacts in summary statement above and in 4.8.6*),
• mention consultation with SHPO and appropriate Native American tribes as required under Section 106 of the NHPA for ground-disturbing activities that may impact historic resources,
• aesthetic impacts, tourism, recreation,
• employment, personal income, utilities, and education,
• transportation impacts, new road development (Dept. Of Transportation),
• environmental justice,
• refurbishment or land-disturbing activities on plant site or Transmission Lines]

4.8.5 Cumulative Impacts on Groundwater Use and Quality

[Address the following issues in this section:
• Location of groundwater supplies,
• past/current/future degradation of groundwater resources from all sources,
• past/current/future use of groundwater resources for all sources,
• current operating groundwater wells and predicted future use of groundwater,
• past/current/future groundwater discharges from nuclear plant and facilities nearby,
• groundwater to surface water interaction]

4.8.6 Conclusions Regarding Cumulative Impacts

[Summarize the impacts. State which impacts were found to be SMALL, MODERATE, LARGE.] The following impacts were analyzed and found not to contribute to cumulative impacts: emissions sources at the nuclear plant in an attainment area, historic and archeological impacts? [add more here or delete if not applicable].

4.9 Summary of Impacts of Operations During the Renewal Term

Neither PPL nor the staff is aware of information that is both new and significant related to any of the applicable Category 1 issues associated with the SSES operation during the renewal term. Consequently, the staff concludes that the environmental impacts associated with these issues are bounded by the impacts described in the GEIS. For each of these issues, the GEIS concluded that the impacts would be SMALL and that additional plant-specific mitigation measures are not likely to be sufficiently beneficial to warrant implementation." OR NRC has identified certain mitigation measures that can reduce the aesthetic and noise impacts associated with Units 1 and 2 (Section 4.7.2) and brought these to PPL's attention.

Plant-specific environmental evaluations were conducted for 11 Category 2 issues applicable to SSES operation during the renewal term and for environmental justice and chronic effects of electromagnetic fields. For 10 issues and environmental justice, the staff concluded that the potential environmental impact of renewal term operations of SSES would be of SMALL significance in the context of the standards set forth in the GEIS and that additional mitigation would not be warranted. For threatened and endangered species, the staff's preliminary conclusion is that the impact resulting from license renewal would be SMALL and further investigation is not warranted. In addition, the staff determined that a consensus has not been reached by appropriate Federal health agencies regarding chronic adverse effects from electromagnetic fields. Therefore, the staff did not conduct an evaluation of this issue.

Cumulative impacts of past, present, and reasonably foreseeable future actions were considered, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. [SUMMARIZE CUMULATIVE IMPACTS DISCUSSION].

4.10 References (Verify)

10 CFR 20. Code of Federal Regulations, Title 10, *Energy*, Part 20, "Standards for Protection Against Radiation."

10 CFR 50. Code of Federal Regulations, Title 10, *Energy*, Part 20, "Domestic Licensing of Production and Utilization Facilities.

10 CFR 51. Code of Federal Regulations, Title 10, *Energy,* Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

59 FR 7629. Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations." *Federal Register.* Vol. 59, No. 32. February 16, 1994.

Council on Environmental Quality (CEQ). 1997. *Environmental Justice: Guidance Under the National Environmental Policy Act.* Executive Office of the President, Washington, D.C.

Endangered Species Act (ESA). 16 USC 1531, et seq.

Ecology III. 2001. *Environmental Studies in the Vicinity of the Susquehanna Steam Electric Station 2000: Water quality and Fishes.* Prepared by Ecology III, Inc., Berwick, Pennsylvania. May.

Ecology III. 2002. *Environmental Studies in the Vicinity of the Susquehanna Steam Electric Station 2000: Water quality and Fishes.* Prepared by Ecology III, Inc., Berwick, Pennsylvania. June.

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9.0 Summary and Conclusions

By letter dated September 13, 2006, PPL Susquehanna, LLC (PPL) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) to renew the operating licenses (OLs) for Susquehanna Steam Electric Station, Units 1 and 2 (SSES) for an additional 20-year period (PPL 2006a). If the OLs are renewed, State regulatory agencies and PPL will ultimately decide whether the plant will continue to operate based on factors such as the need for power or other matters within the State's jurisdiction or the purview of the owners. If the OLs are not renewed, then the plants must be shut down at or before the expiration of the current OLs, which expire on July 17, 2022, for Unit 1, and March 23, 2044, for Unit 2.

Section 102 of the National Environmental Policy Act (NEPA) (42 USC 4321) directs that an environmental impact statement (EIS) is required for major Federal actions that significantly affect the quality of the human environment. The NRC has implemented Section 102 of NEPA in Part 51 of Title 10 of the Code of Federal Regulations (10 CFR Part 51). Part 51 identifies licensing and regulatory actions that require an EIS. In 10 CFR 51.20(b)(2), the Commission requires preparation of an EIS or a supplement to an EIS for renewal of a reactor OL; 10 CFR 51.95(c) states that the EIS prepared at the OL renewal stage will be a supplement to the *Generic Environmental Impact Statement for License Renewal of Nuclear Plant*s (GEIS), NUREG-1437, Volumes 1 and 2 (NRC 1996; 1999).[(a)1]

Upon acceptance of the PPL application, the NRC began the environmental review process described in 10 CFR Part 51 by publishing a notice of intent to prepare an EIS and conduct scoping (*Federal Register*, Volume 71, page 64566 [71 FR 64566] [NRC 2006a]) on November 2, 2006. The staff visited the SSES site in August 2006 and held public scoping meetings on November 15, 2006, in Berwick, Pennsylvania (NRC 2006). The staff reviewed the PPL Environmental Report (ER; PPL 2006b) and compared it to the GEIS, consulted with other agencies, and conducted an independent review of the issues following the guidance set forth in NUREG-1555, Supplement 1, the *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal* (NRC 2000b). The staff also considered the public comments received during the scoping process for preparation of this draft Supplemental Environmental Impact Statement (SEIS) for SSES. The public comments received during the scoping process that were considered to be within the scope of the environmental review are provided in Appendix A, Part 1, of this SEIS.

The staff will hold two public meetings in Berwick, Pennsylvania in March 2008, to describe the preliminary results of the NRC environmental review and to answer questions to provide members of the public with information to assist them in formulating their comments on this

[1(a)] The GEIS was originally issued in 1996. Addendum 1 to the GEIS was issued in 1999. Hereafter, all references to the "GEIS" include the GEIS and its Addendum 1.

draft SEIS. When the comment period ends, the staff will consider and address all of the comments received. These comments will be addressed in Appendix A, Part 2, of the final SEIS.

This draft SEIS includes the NRC staff's preliminary analysis that considers and weighs the environmental effects of the proposed action, including cumulative impacts, the environmental impacts of alternatives to the proposed action, and mitigation measures available for reducing or avoiding adverse effects. This draft SEIS also includes the staff's preliminary recommendation regarding the proposed action.

The NRC has adopted the following statement of purpose and need for license renewal from the GEIS:

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

The evaluation criterion for the staff's environmental review, as defined in 10 CFR 51.95(c)(4) and the GEIS, is to determine

> ... whether or not the adverse environmental impacts of license renewal are so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable.

Both the statement of purpose and need and the evaluation criterion implicitly acknowledge that there are factors, in addition to license renewal, that will ultimately determine whether an existing nuclear power plant continues to operate beyond the period of the current OL.

NRC regulations [10 CFR 51.95(c)(2)] contain the following statement regarding the content of SEISs prepared at the license renewal stage:

> The supplemental environmental impact statement for license renewal is not required to include discussion of need for power or the economic costs and economic benefits of the proposed action or of alternatives to the proposed action except insofar as such benefits and costs are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation. In addition, the supplemental environmental impact statement prepared at the license renewal stage

need not discuss other issues not related to the environmental effects of the proposed action and the alternatives, or any aspect of the storage of spent fuel for the facility within the scope of the generic determination in § 51.23(a) and in accordance with § 51.23(b).[(a)2]

The GEIS contains the results of a systematic evaluation of the consequences of renewing an OL and operating a nuclear power plant for an additional 20 years. It evaluates 92 environmental issues using the NRC's three-level standard of significance--SMALL, MODERATE, or LARGE--developed using the Council on Environmental Quality guidelines. The following definitions of the three significance levels are set forth in the footnotes to Table B-1 of 10 CFR Part 51, Subpart A, Appendix B:

SMALL - Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE - Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

LARGE - Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

For 69 of the 92 issues considered in the GEIS, the staff analysis in the GEIS shows the following:

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

(2) A single significance level (i.e., SMALL, MODERATE, or LARGE) has been assigned to the impacts (except for collective off-site radiological impacts from the fuel cycle and from high-level waste [HLW] and spent fuel disposal).

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

These 69 issues were identified in the GEIS as Category 1 issues. In the absence of new and significant information, the staff relied on conclusions as amplified by supporting information in the GEIS for issues designated Category 1 in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B. The staff also determined that information provided during the public comment

2 (a) The title of 10 CFR 51.23 is "Temporary storage of spent fuel after cessation of reactor operations-generic determination of no significant environmental impact.

period did not identify any new issue that requires site-specific assessment.

Of the 23 issues that do not meet the criteria set forth above, 21 are classified as Category 2 issues requiring analysis in a plant-specific supplement to the GEIS. The remaining two issues, environmental justice and chronic effects of electromagnetic fields, were not categorized. Environmental justice was not evaluated on a generic basis and must also be addressed in a plant-specific supplement to the GEIS. Information on the chronic effects of electromagnetic fields was not conclusive at the time the GEIS was prepared.

This draft SEIS documents the staff's consideration of all 92 environmental issues identified in the GEIS. The staff considered the environmental impacts associated with alternatives to license renewal and compared the environmental impacts of license renewal and the alternatives. The alternatives to license renewal that were considered include the no-action alternative (not renewing the OLs for SSES Units, 1 and 2) and alternative methods of power generation. These alternatives were evaluated assuming that the replacement power generation plant is located at either the SSES site or some other unspecified greenfield location.

9.1 Environmental Impacts of the Proposed Action-License Renewal

PPL and the staff have established independent processes for identifying and evaluating the significance of any new information on the environmental impacts of license renewal. Neither PPL nor the staff has identified information that is both new and significant related to Category 1 issues that would call into question the conclusions in the GEIS. Similarly, neither the scoping process, PPL, nor the staff has identified any new issue applicable to SSES, that has a significant environmental impact. Therefore, the staff relies upon the conclusions of the GEIS for all Category 1 issues that are applicable to SSES.

PPL's license renewal application presents an analysis of the Category 2 issues that are applicable to SSES Units 1 and 2, plus environmental justice and chronic effects from electromagnetic fields. The staff has reviewed the PPL analysis for each issue and has conducted an independent review of each issue plus environmental justice and chronic effects from electromagnetic fields. Five Category 2 issues are not applicable because they are related to plant design features or site characteristics not found at SSES. Four Category 2 issues are not discussed in this draft SEIS because they are specifically related to refurbishment. PPL (PPL 2006b) has stated that its evaluation of structures and components, as required by 10 CFR 54.21, did not identify any major plant refurbishment activities or modifications as necessary to support the continued operation of SSES, for the license renewal period. In addition, any replacement of components or additional inspection activities are within the bounds of normal plant component replacement and, therefore, are not expected to affect

the environment outside of the bounds of the plant operations evaluated in the Final Environmental Statement Related to Operation of SSES (AEC 1972).

Twelve (total number of Cat 2 issues addressed in EIS plus 1 issue [SAMA from chp. 5]) Category 2 issues related to operational impacts and postulated accidents during the renewal term, as well as environmental justice and chronic effects of electromagnetic fields, are discussed in detail in this draft SEIS. Four of the Category 2 issues and environmental justice apply to both refurbishment and to operation during the renewal term and are only discussed in this draft SEIS in relation to operation during the renewal term. For all 12 Category 2 issues and environmental justice, the staff concludes that the potential environmental effects are of SMALL significance in the context of the standards set forth in the GEIS. In addition, the staff determined that appropriate Federal health agencies have not reached a consensus on the existence of chronic adverse effects from electromagnetic fields. Therefore, no further evaluation of this issue is required. For severe accident mitigation alternatives (SAMAs), the staff concludes that a reasonable, comprehensive effort was made to identify and evaluate SAMAs. Based on its review of the SAMAs for SSES, and the plant improvements already made, the staff concludes that none of the candidate SAMAs are cost-beneficial. OR see Robinson SEIS for alternative ending if cost-beneficial SAMAs are identified.

Mitigation measures were considered for each Category 2 issue. Current measures to mitigate the environmental impacts of plant operation were found to be adequate, and no additional mitigation measures were deemed sufficiently beneficial to be warranted.
(Wait for all sections to be edited then modify this paragraph)

Cumulative impacts of past, present, and reasonably foreseeable future actions were considered, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. For purposes of this analysis, where SSES license renewal impacts are deemed to be SMALL, the staff concluded that these impacts would not result in significant cumulative impacts on potentially affected resources.

The following sections discuss unavoidable adverse impacts, irreversible or irretrievable commitments of resources, and the relationship between local short-term use of the environment and long-term productivity.

9.1.1 Unavoidable Adverse Impacts

An environmental review conducted at the license renewal stage differs from the review conducted in support of a construction permit because the plant is in existence at the license renewal stage and has operated for a number of years. As a result, adverse impacts associated with the initial construction have been avoided, have been mitigated, or have already occurred. The environmental impacts to be evaluated for license renewal are those associated with refurbishment and continued operation during the renewal term.

The adverse impacts of continued operation identified are considered to be of SMALL significance, and none warrants implementation of additional mitigation measures. The adverse impacts of likely alternatives if SSES, ceases operation at or before the expiration of the current OLs will not be smaller than those associated with continued operation of these units, and they may be greater for some impact categories in some locations.

9.1.2 Irreversible or Irretrievable Resource Commitments

The commitment of resources related to construction and operation of the SSES, during the current license period was made when the plant was built. The resource commitments to be considered in this draft SEIS are associated with continued operation of the plant for an additional 20 years. These resources include materials and equipment required for plant maintenance and operation, the nuclear fuel used by the reactors, and ultimately, permanent offsite storage space for the spent fuel assemblies.

The most significant resource commitments related to operation during the renewal term are the fuel and the permanent storage space. SSES replaces approximately one third of the fuel assemblies in each of the two units on a 24-month refueling cycle with Units 1 and 2 refueling on alternate years.

The likely power generation alternatives if SSES, ceases operation on or before the expiration of the current OLs will require a commitment of resources for construction of the replacement plants as well as for fuel to run the plants.

9.1.2 Short-Term Use Versus Long-Term Productivity

An initial balance between short-term use and long-term productivity of the environment at the SSES site was set when the plant was approved and construction began. That balance is now well established. Renewal of the OLs for SSES, and continued operation of the plant will not alter the existing balance, but may postpone the availability of the site for other uses. Denial of the application to renew the OLs will lead to shutdown of the plant and will alter the balance in a manner that depends on subsequent uses of the site. For example, the environmental consequences of turning the SSES site into a park or an industrial facility are quite different.

9.2 Relative Significance of the Environmental Impacts of License Renewal and Alternatives

The proposed action is renewal of the OLs for SSES. Chapter 2 describes the site, power plant, and interactions of the plant with the environment. As noted in Chapter 3, no refurbishment and no refurbishment impacts are expected at SSES, Chapters 4 through 7

discuss environmental issues associated with renewal of the OLs. Environmental issues associated with the no-action alternative and alternatives involving power generation and use reduction are discussed in Chapter 8.

The significance of the environmental impacts from the proposed action (approval of the application for renewal of the OLs), the no-action alternative (denial of the application), alternatives involving nuclear or coal-, gas- generation of power at the SSES site and an unspecified "greenfield site," and a combination of alternatives are compared in Table 9-1. Continued use of a closed-cycle cooling system for SSES, is assumed for Table 9-1.

Substitution of once-through cooling for the recirculating cooling system in the evaluation of the nuclear and gas- and coal-fired generation alternatives would result in somewhat greater environmental impacts in some impact categories. {This remains to be seen}

Table 9-1 shows that the significance of the environmental effects of the proposed action are SMALL for all impact categories (except for collective offsite radiological impacts from the fuel cycle and from HLW and spent fuel disposal, for which a single significance level was not assigned [see Chapter 6]). The alternative actions, including the no-action alternative, may have environmental effects in at least some impact categories that reach MODERATE or LARGE significance.

9.2 Staff Conclusions and Recommendations

Based on (1) the analysis and findings in the GEIS (NRC 1996; 1999), (2) the ER submitted by PPL (PPL 2006b), (3) consultation with Federal, State, and local agencies, (4) the staff's own independent review, and (5) the staff's consideration of public comments received, the preliminary recommendation of the staff is that the Commission determine that the adverse environmental impacts of license renewal for SSES, are not so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable.

Table 9-1. Summary of Environmental Significance of License Renewal, the No-Action Alternative, and Alternative Methods of Generation Using Once-Through Cooling (Waiting for for Drew's write-up)

	Proposed Action	No-Action Alternative	Coal-Fired Generation		Natural-Gas-Fired Generation		New Nuclear Generation		Combination of Alternatives	
Impact Category	License Renewal	Denial of Renewal	SSES Site	Alternate Greenfield Site	SSES Site	Alternate Greenfield Site	SSES Site	Alternate Greenfield Site	SSES Site	Alternate Greenfield Site
Land Use	SMALL	SMALL	MODERATE to LARGE	MODERATE to LARGE	MODERATE	MODERATE to LARGE	MODERATE	MODERATE to LARGE	MODERATE to LARGE	MODERATE to LARGE
Ecology	SMALL	SMALL	MODERATE	MODERATE to LARGE	SMALL to MODERATE	MODERATE to LARGE	MODERATE	MODERATE to LARGE	SMALL to MODERATE	MODERATE to LARGE
Water Use and Quality-Surface Water	SMALL	SMALL	SMALL	SMALL to MODERATE	SMALL	SMALL to MODERATE	SMALL	SMALL to MODERATE	SMALL	SMALL to MODERATE
Water Use and Quality-Groundwater	SMALL	SMALL	SMALL	SMALL to MODERATE	SMALL	SMALL to MODERATE	SMALL	SMALL to LARGE	SMALL	SMALL to LARGE
Air Quality	SMALL	SMALL	MODERATE	MODERATE	MODERATE	MODERATE	SMALL	SMALL	MODERATE	MODERATE
Waste	SMALL	SMALL	MODERATE	MODERATE	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL
Human Health	SMALL(a)	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL
Socio-economics	SMALL	MODERATE	MODERATE to LARGE	MODERATE to LARGE	MODERATE	MODERATE	MODERATE to LARGE	MODERATE to LARGE	MODERATE	MODERATE
Transportation	SMALL	SMALL	SMALL to LARGE	SMALL to LARGE	SMALL to MODERATE	SMALL to LARGE	SMALL to LARGE	SMALL to LARGE	SMALL to MODERATE	SMALL to LARGE
Aesthetics	SMALL	SMALL	MODERATE	MODERATE to LARGE	MODERATE	MODERATE to LARGE	SMALL to MODERATE	SMALL to LARGE	MODERATE	MODERATE to LARGE
Historic and Archaeological Resources	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL
Environmental Justice	SMALL	MODERATE	SMALL to LARGE	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL	SMALL to LARGE	SMALL to MODERATE	SMALL to MODERATE

(a) Except for collective offsite radiological impacts from the fuel cycle and from HLW and spent-fuel disposal, for which a significance level was not assigned. See Section 6 for details.

9.4 References (Verify)

10 CFR 51. Code of Federal Regulations, Title 10, Energy, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

10 CFR 54. Code of Federal Regulations, *Title 10, Energy,* Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants."

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