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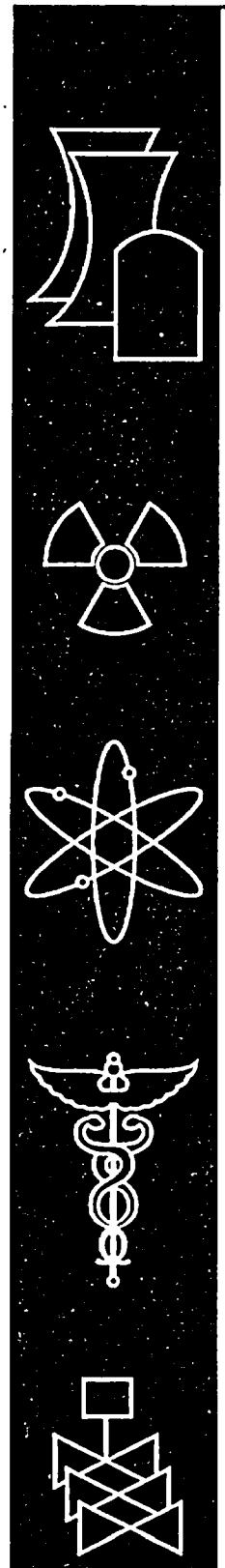

Generic Environmental Impact Statement for License Renewal of Nuclear Plants

Supplement 22

Regarding
Millstone Power Station, Units 2 and 3

Final Report

U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, DC 20555-0001

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NUREG-1437
Supplement 22

Generic Environmental Impact Statement for License Renewal of Nuclear Plants

Supplement 22

Regarding Millstone Power Station, Units 2 and 3

Final Report

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Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
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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 Title 10 of the Code of Federal Regulations (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 applications submitted to the NRC by Dominion Nuclear Connecticut, Inc. (Dominion) to renew the OLs for Millstone Power Station, Units 2 and 3 (Millstone) for an additional 20 years under 10 CFR Part 54. This 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 recommendation regarding the proposed action.

Regarding the 69 issues for which the GEIS reached generic conclusions, neither Dominion nor the staff has identified information that is both new and significant for any issue that applies to Millstone. 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 Millstone 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 would be of SMALL[(a)] significance (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 Millstone are addressed in this SEIS. The staff concludes that the significance of the potential environmental impacts of renewal of the OLs is SMALL for each applicable issue with two exceptions. For entrainment, the staff concludes that the impact is MODERATE, and the magnitude of impact for the chronic effects of electromagnetic fields is "uncertain." The staff also concludes that additional mitigation measures are not likely to be sufficiently beneficial as to be warranted. The staff determined that information provided during the scoping process did not identify any new issue that has a significant environmental impact.

(a) Environmental impacts are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

Abstract

The NRC staff's recommendation is that the Commission determine that the adverse environmental impacts of license renewal for Millstone 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 Dominion; (3) consultation with Federal, State, and local agencies; (4) the staff's own independent review; and (5) the staff's consideration of public comments.

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Executive Summary

By letter dated January 20, 2004, the Dominion Nuclear Connecticut, Inc. (Dominion) submitted applications to the U.S. Nuclear Regulatory Commission (NRC) to renew the operating licenses (OLs) for Millstone Power Station, Units 2 and 3 for an additional 20-year period. If the OLs are renewed, State regulatory agencies and Dominion 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 dates of the current OLs, which are July 31, 2015 for Unit 2 and November 25, 2025 for Unit 3.

The NRC has implemented Section 102 of the National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321) in 10 CFR Part 51. In 10 CFR 51.20(b)(2), the Commission requires preparation of an environmental impact statement (EIS) or a supplement to an EIS for renewal of a reactor OL. In addition, 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 Plants* (GEIS), NUREG-1437, Volumes 1 and 2.[a]

Upon acceptance of the Dominion applications, 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 NRC staff visited the Millstone site in May 2004 and held public scoping meetings on May 18, 2004, in Waterford, Connecticut. In the preparation of this supplemental environmental impact statement (SEIS) for Millstone, the staff reviewed the Dominion 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.

A draft SEIS was published in December 2004. The staff held two public meetings in Waterford, Connecticut, in January 2005, 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 ended, the staff considered and dispositioned all of the comments received. These comments are addressed in Appendix A, Part 2 of this 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 analysis, which 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 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 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 Millstone) and alternative methods of power generation. Based on projections made by the U.S. Department of Energy's Energy Information Administration, gas- and coal-fired generation appear to be the most likely power-generation alternatives if the power from Millstone is replaced. These alternatives are evaluated assuming that the replacement power generation plant is located at either the Millstone site or some other unspecified alternate location.

Dominion 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 Dominion 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 Millstone, that has a significant environmental impact. These determinations included consideration of public comments. Therefore, the staff relies upon the conclusions of the GEIS for all of the Category 1 issues that are applicable to Millstone.

Dominion's license renewal applications present an analysis of the Category 2 issues. The staff has reviewed the Dominion analysis for each issue and has conducted an independent review of each issue. Six Category 2 issues are not applicable, because they are related to plant design features or site characteristics not found at Millstone. Four Category 2 issues are not discussed in this SEIS, because they are specifically related to refurbishment. Dominion 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 Millstone 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 1973 *Final Environmental Statement Related to the Continuation of Construction of Unit 2 and the Operation of Units 1 and 2, Millstone Nuclear Power Station* and in the NRC's 1984 *Final Environmental Statement related to operation of Millstone Nuclear Power Station, Unit No. 3.*

Eleven 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 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 SEIS in relation to operation during the renewal term. For 10 of the Category 2 issues and environmental justice, the staff concludes that the potential environmental effects would be of SMALL significance in the context of the standards set forth in the GEIS. For entrainment, the staff concludes that the potential environmental effects would be of MODERATE 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 Millstone and the plant improvements already made, the staff concludes that one of the candidate SAMAs is cost-beneficial for Unit 2. One additional SAMA for each unit could be cost-beneficial if it can be implemented by severe accident management guidelines without hardware modifications. None of these SAMAs relate to adequately managing the effects of aging during the period of extended operation. Therefore, they need not be implemented as part of license renewal pursuant to 10 CFR Part 54.

If the Millstone operating licenses are not renewed and the units cease operation on or before the expiration of their current operating licenses, the adverse impacts of likely alternatives will not be smaller than those associated with continued operation of Millstone. The impacts may, in fact, be greater in some areas.

The recommendation of the NRC staff is that the Commission determine that the adverse environmental impacts of license renewal for Millstone 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 Dominion; (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.

Abbreviations/Acronyms

°	degree(s)
µg	microgram(s)
µg/kg	microgram(s) per kilogram
µm	micrometers(s)
ac	acre(s)
AAGR	Annual Average Growth Rate
AC	alternating current electricity
ACC	averted cleanup and decontamination costs
AD	Anno Domini
ADAMS	Nuclear Regulatory Commission's Agencywide Documents Access and Management System
AE	assessment endpoint
AEC	U.S. Atomic Energy Commission
AFW	auxiliary feedwater
ALARA	as low as reasonably achievable
AOC	present value of averted offsite property damage costs
AOE	present value of averted occupational exposure costs
AOSC	present value of averted onsite costs
AOV	air-operated valve
APE	present value of averted public exposure
ATWS	anticipated transients without scram
BA	Biological Assessment
BC	Before Christ
Bq	becquerel(s)
Bq/L	bequerel(s) per liter
BTU	British thermal unit(s)
BTU/kWh	British thermal units per kilowatt-hour
cm	centimeter(s)
C	Celsius
CASE	Connecticut Academy of Science and Engineering
CCF	common cause failure
CCW	component cooling water
CDF	core damage frequency
CE	Combustion Engineering
CEOG	Combustion Engineering Owners Group
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations

Ci	curie(s)
CL&P	Connecticut Light and Power Company
COE	cost of enhancement
COOL	loss of cooling water to primary side components
CPUE	catch per unit effort
CTDEP	Connecticut Department of Environmental Protection
CTDPH	Connecticut Department of Public Health
CWA	Clean Water Act
DBA	design-basis accident
DC	direct current electricity
DOE	U.S. Department of Energy
Dominion	Dominion Nuclear Connecticut, Inc.
DSEIS	Draft Supplemental Environmental Impact Statement
DSM	demand-side management
DWST	demineralized water storage tank
EDG	emergency diesel generator
EIA	Energy Information Administration (of U.S. DOE)
EIS	environmental impact statement
ELF-EMF	extremely low frequency-electromagnetic field
EPA	U.S. Environmental Protection Agency
EPRI	Electric Power Research Institute
ER	Environmental Report
ESA	Endangered Species Act
ESF	Engineered safeguards feature
ESFRS	Engineered safeguards feature room service
ft	foot/feet
ft/s	foot/feet per second
ft^3	cubic foot/feet
ft^3/s	cubic foot/feet per second
F	Fahrenheit
FAA	Federal Aviation Administration
FES	Final Environmental Statement
FR	Federal Register
FSAR	Final Safety Analysis Report
FWS	U.S. Fish and Wildlife Service
g	acceleration due to the force of gravity (9.8 m/s^2)
gal	gallon(s)

gpd	gallon(s) per day
gpm	gallon(s) per minute
GEIS	Generic Environmental Impact Statement for License Renewal of Nuclear Plants, NUREG-1437
Gy	gray (joules per kilogram)
ha	hectare(s)
hr	hour(s)
HCLPF	high-confidence low-probability of failure
HEPA	high-efficiency particulate air (filter)
HLW	high-level radioactive waste
HPSI	high pressure safety injection
HRA	human reliability analysis
Hz	Hertz
in.	inch(es)
I	Interstate
ICRP	International Commission on Radiological Protection
IPE	Individual Plant Examination
IPEEE	Individual Plant Examination of External Events
ISLOCA	interfacing systems loss-of-coolant accident
J	joule(s)
kg	kilogram(s)
km	kilometer(s)
km/hr	kilometer(s) per hour
km/s	kilometer(s) per second
km^2	square kilometer(s)
kPa	kilopascal(s)
kV	kilovolt(s)
kWh	kilowatt hour(s)
lb	pound(s)
L	liter(s)
L/d	liter(s) per day
LIS	Long Island Sound
LOCA	loss-of-coolant accident
LOOP	loss of offsite power
LPSI	low pressure safety injection
LWR	light-water reactor

m	meter(s)
m/s	meter(s) per second
m/s^2	meter(s) per square second
m^3/s	cubic meter(s) per second
mA	milliampere(s)
mg/L	milligram(s) per liter
mGy	milligray
mi	mile(s)
mi^2	square mile(s)
mL	milliliter(s)
mm	millimeter(s)
mph	mile(s) per hour
mrad	millirad
mrem	millirem
mSv	millisievert
MACCS2	MELCOR Accident Consequence Code 2
ME	measurement endpoints
MG	motor generator
Millstone	Millstone Power Station, Units 2 and 3
MOV	motor-operated valve
MPS2	Millstone Power Station, Unit 2
MPS3	Millstone Power Station, Unit 3
MSIV	main steam isolation valve
MT	metric ton(s) (or tonne[s])
MTHM	metric ton(s) heavy metal
MT/y	metric ton(s) per year
MW	megawatt(s)
MW(e)	megawatt(s) electric
MW(t)	megawatt(s) thermal
MWh	megawatt hour(s)
NAS	National Academy of Sciences
NCI	National Cancer Institute
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act of 1969
NESC	National Electric Safety Code
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NMFS	National Marine Fisheries Service
NNECO	Northeast Nuclear Energy Company
NO_x	nitrogen oxide(s)

NOAA	National Oceanic and Atmospheric Adminstration
NPDES	National Pollutant Discharge Elimination System
NRC	U.S. Nuclear Regulatory Commission
NU	Northeast Utilities
NUSCO	Northeast Utilities Service Company
OL	operating license
pCi	picocurie(s)
pCi/L	picocurie(s) per liter
persons/km^2	persons per square kilometer
persons/mi^2	persons per square mile
ppb	parts per billion
ppm	parts per million
PDS	plant damage state
PORV	pilot-operated relief valve
PRA	Probabilistic Risk Assessment
psi	pound(s) per square inch
PWR	pressurized water reactor
rem	roentgen equivalent man
RAI	request for additional information
RBCCW	reactor building closed cooling water
RCP	reactor coolant pump
RCS	reactor coolant system
RCRA	Resource Conservation and Recovery Act
REMODCM	Radiological Effluent Monitoring and Offsite Dose Calculation Manual
REMP	radiological environmental monitoring program
ROW	right(s)-of-way
RPC	replacement power costs
RPS	reactor protection system
RWST	refueling water storage tank
s	second(s)
SARC	Stock Assessment Report Committee
SAMA	Severe Accident Mitigation Alternative
SAMG	severe accident management guideline(s)
SAR	Safety Analysis Report
SBO	station blackout
SCCOG	Southeastern Connecticut Council of Governments
SEER	Surveillance, Epidemiology, and End Result (report[s])

SEIS	Supplemental Environmental Impact Statement
SER	Safety Evaluation Report
SGTR	steam generator tube rupture
SMA	Seismic Margins Assessment
SNEMA	Southern New England Mid-Atlantic
SO_2	sulfur dioxide
SO_x	sulfur oxide(s)
SW	service water
Sv	sievert
UMDH	1,1-dimethylhydrazine
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
V	volt
WOG	Westinghouse Owners Group
yr	year

1.0 Introduction

Under the Nuclear Regulatory Commission's (NRC) environmental protection regulations in Title 10 of the Code of Federal Regulations (CFR) Part 51, which implement the National Environmental Policy Act of 1969 (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 Dominion Nuclear Connecticut, Inc. (Dominion) operates Millstone Power Station, Units 2 and 3 (Millstone) in Connecticut under OLs DPR-65 and NPF-49, which were issued by the NRC. These OLs will expire July 31, 2015 for Unit 2 and November 25, 2025 for Unit 3. On January 20, 2004, Dominion submitted applications to the NRC to renew the Millstone Power Station, Units 2 and 3 OLs for an additional 20 years under 10 CFR Part 54. Dominion 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), Dominion submitted an Environmental Report (ER) (Dominion 2004a) in which it 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 impacts.

This report is the plant-specific supplement to the GEIS (the supplemental EIS [SEIS]) for the Dominion license renewal applications. 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 Millstone OLs, (3) discuss the purpose and need for the proposed action, and (4) present the status of Dominion'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 recommendation with respect to the proposed license renewal action.

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

- The preparers of the supplement
- The chronology of NRC staff environmental review correspondence related to this SEIS
- The organizations contacted during the development of this SEIS
- Dominion's compliance status in Table E-1 (this appendix also contains copies of consultation correspondence sent and received during the evaluation process)
- GEIS environmental issues that are not applicable to Millstone
- State-listed Threatened and Endangered Species

- Severe accident mitigation alternatives — Unit 2
- Severe accident mitigation alternatives — Unit 3

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 impacts, (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 terminology for "significantly" (40 CFR 1508.27, which requires consideration of both "context" and "intensity.") Using the Council on Environmental Quality terminology, the NRC established three significance levels—SMALL, MODERATE, and 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, 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, among other things,

- 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); and
- 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) and (3)(iii) and (iv), 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); or
- contain an analysis of any Category 1 issue unless there is new and significant information on a specific issue.

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 applications to renew the Millstone OLs, Dominion developed a process to ensure that information not addressed in or available during the GEIS evaluation regarding the environmental impacts of license renewal for Millstone 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 Units 2 and 3 would be identified, reviewed, and assessed during the period of NRC review. Dominion 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 Millstone. This review was performed by personnel from Dominion 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*, NUREG-1555, Supplement 1 (NRC 2000a). 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 Millstone. In each chapter, 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 SEIS sections where the analysis is presented. The 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 Dominion license renewal application began with publication of a notice of acceptance for docketing and opportunity for a hearing in the *Federal Register* (NRC 2004a) on March 12, 2004. The staff published a notice of intent to prepare an EIS and conduct scoping (NRC 2004b) on April 7, 2004. Two public scoping meetings were held on May 18, 2004, in Waterford, Connecticut. Comments received during the scoping period were summarized in the *Environmental Impact Statement Scoping Process: Summary Report – Millstone Power Station, Units 2 and 3, New London County, Connecticut* (NRC 2004c) dated August 27, 2004. 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, *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal* (NRC 2000). The staff and contractor retained to assist the staff visited the Millstone site on May 19 and 20, 2004, 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 Millstone were reviewed and are referenced.

On December 9, 2004, the NRC published the Notice of Availability of the draft SEIS in 69 FR 71437 (NRC 2004d). A 75-day comment period began 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 were held in Waterford, Connecticut, in January 2005. During these meetings, the staff described the preliminary results of the NRC environmental review and answered questions related to it to provide members of the public with information to assist them in formulating their comments. The comment period for the Millstone draft SEIS ended on March 2, 2005. Comments made during the 75-day comment period, including those made at the two public meetings, are presented in Part 2 of Appendix A of this SEIS. The NRC responses to those comments are also provided.

This SEIS presents the staff's analysis that considers and weighs the environmental impacts of the proposed renewal of the OLs for Millstone, the environmental impacts of alternatives to license renewal, and mitigation measures available for avoiding adverse environmental impacts. Chapter 9, "Summary and Conclusions," provides the NRC staff's 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.

1.3 The Proposed Federal Action

The proposed Federal action is renewal of the OLs for Millstone. The Millstone site is located in Waterford, Connecticut on the coast between the Niantic and Thames Rivers, approximately 64 kilometers (km) (40 miles [mi]) east of New Haven, 64 km (40 mi) southeast of Hartford, and 32 km (20 mi) west of Rhode Island. Unit 2 is a Combustion Engineering–designed pressurized-water reactor with a design power level of 2700 megawatts thermal (MW[t]) and a net power output of 870 megawatts electric (MW[e]). Unit 3 is a Westinghouse-designed pressurized-water reactor with a design power level of 3411 MW(t) and a net power output of 1154 MW(e). Plant cooling is provided by a once-through cooling-water system that is withdrawn from Niantic Bay and dissipates heat by discharge into Long Island Sound. Units 2 and 3 produce electricity to meet about 50 percent of the electrical use of Connecticut. The current OL for Unit 2 expires on July 31, 2015, and for Unit 3 on November 25, 2025. By letter dated January 20, 2004, Dominion submitted an application to the NRC (Dominion 2004b) to renew these OLs for an additional 20 years of operation (i.e., until July 31, 2035, for Unit 2 and November 25, 2045, for Unit 3).

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

Dominion is required to hold certain Federal, State, and local environmental permits, as well as meet relevant Federal and State statutory requirements. In its ER, Dominion provided a list of the authorizations from Federal, State, and local authorities for current operations, as well as environmental approvals and consultations associated with Millstone license renewal. Authorizations and consultations relevant to the proposed OL renewal action are included in Appendix E.

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 Dominion is in compliance with applicable environmental standards and requirements for Millstone. The staff has not identified any environmental issues that are both new and significant.

1.6 References

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

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

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

Atomic Energy Act of 1954. 42 United States Code (USC) 2011, et seq.

Dominion Nuclear Connecticut, Inc. (Dominion). 2004a. *Applicant's Environmental Report — Operating License Renewal Stage Millstone Power Station, Units 2 and 3.* Waterford, Connecticut.

Dominion Nuclear Connecticut, Inc. (Dominion). 2004b. *Applications for Renewed Operating Licenses, Millstone Power Station, Units 2 and 3.* Waterford, Connecticut.

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

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). 2000. *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Main Report, Supplement 1: Operating License Renewal.* NUREG-1555, Supplement 1, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 2004a. "Notice of Acceptance for Docketing of the Application and Notice of Opportunity for a Hearing Regarding Renewal of License Nos. DPR-65 and NPF-49 for an Additional Twenty-Year Period." *Federal Register,* Vol. 69, No. 49, pp. 11897–11898. Washington, D.C. March 12, 2004.

U.S. Nuclear Regulatory Commission (NRC). 2004b. "Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process." *Federal Register,* Vol. 69, No. 67, pp. 18409–18410. Washington, D.C. April 7, 2004.

U.S. Nuclear Regulatory Commission (NRC). 2004c. *Environmental Impact Statement Scoping Process: Summary Report – Millstone Power Station, Units 2 and 3, New London County, Connecticut.* Washington, D.C. August 27, 2004. ADAMS Accession No. ML042400543.

U.S. Nuclear Regulatory Commission (NRC). 2004d. "Dominion Nuclear Connecticut, Inc., Millstone Power Station, Units 2 and 3; Notice of Availability of the Draft Supplement 22 to the Generic Environmental Impact Statement and Public Meeting for the License Renewal of Millstone Power Station, Units 2 and 3." *Federal Register,* Vol. 69, No. 236, pp. 71437–71438. Washington, D.C. December 9, 2004.

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

Millstone Power Station, Units 2 and 3 (Millstone) is located in Waterford, Connecticut, on Millstone Point, between the Niantic and Thames Rivers on Long Island Sound. The nearest large cities are New Haven, approximately 64 kilometers (km) (40 miles [mi]) to the west, and Hartford, approximately 64 km (40 mi) to the northwest. The site is situated on the edge of Long Island Sound and Niantic Bay and is approximately 32 km (20 mi) west of Rhode Island. At one time, there were three operating nuclear power plants at the Millstone site. Construction on Unit 1 began in 1966, on Unit 2 in 1970, and on Unit 3 in 1974. Unit 1 was a boiling-water reactor that began operations in November 1970 and was permanently shut down in 1995. The facility is in long-term storage awaiting decontamination and dismantlement as part of station decommissioning. Unit 1 is not part of these license renewal applications. Millstone Unit 2 is a two-loop, pressurized-water nuclear reactor with a calculated electrical output of approximately 870 megawatts electric (MW[e]); while Millstone Unit 3 is a four-loop, pressurized-water nuclear reactor with a calculated electrical output of approximately 1,154 MW(e) (Dominion Nuclear Connecticut Inc. [Dominion] 2004a). Unit 2 began operations in December 1975, while Unit 3 began operations in April 1986. Units 2 and 3 were shut down in late 1995, with Unit 3 returning to service in July 1998 and Unit 2 in May 1999. Millstone 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

Prior to development as a power facility, Millstone Point was the site of a granite quarry that operated for approximately two centuries, until 1960. The granite from this quarry was used in the base of the Statue of Liberty, in Grand Central Terminal, in the United Nations building in New York City, and in the foundation of the U.S. Supreme Court building in Washington D.C. (Bachman 2000). The quarry, now flooded and connected to Long Island Sound, receives the cooling water discharge from Millstone. A small settlement with its own railroad station, post office and school provided for the employees and their families prior to World War I and the advent of the widespread use of concrete. In 1951, 46 hectares (ha) (114 acres [ac]) including the quarry was purchased for a coal-burning power plant, but this was instead built in Middletown, Connecticut. The site was later expanded to approximately 200 ha (500 ac) for use as a nuclear power plant (Bachman 2000). The topography consists of low rolling hills inland of the peninsular site. The maximum height above mean sea level within 4.8 km (3 mi) of the site is 76 meters (m) (250 feet [ft]). The area surrounding Millstone is a forested landscape of old New England towns and villages, interspersed with some agricultural land, industrial

facilities, and undeveloped areas. The region within 10 km (6 mi) of the site includes parts of the towns of Waterford, New London, Groton, East Lyme and Old Lyme. These towns are all contiguous. The most populous community within 16 km (10 mi) of the site is Groton. The largest cities within an 80-km (50-mi) radius are Hartford and New Haven, each with a population of about 123,000. Providence, Rhode Island lies just outside of the 80-km (50-mi) radius and has a population of about 174,000 (U.S. Census Bureau [USCB] 2000). Figures 2-1 and 2-2 show the location of Millstone in relationship to the major towns and cities within an 80-km (50-mi) and 10-km (6-mi) radius, respectively.

2.1.1 External Appearance and Setting

Millstone is sited on a peninsula that includes rocky beaches, coastal tidal marshes, and second-growth hardwood forests. Old stone cobble walls and fields from when the area was farmed overlie this landscape. Facility features at the 212-ha (525-ac) Millstone site include reactor buildings, auxiliary buildings, intake and discharge structures, turbine buildings, a radioactive waste facility, fuel handling buildings, switchyard and associated transmission lines, an environmental laboratory, and training facilities (Figure 2-3). Other site features include a natural area that is approximately 20 ha (50 ac) and recreational fields licensed to the town of Waterford that comprise approximately 12 ha (30 ac). In all, about 120 ha (300 ac) exist within the site that are not developed for the power station. The site is bisected by the Northeast Corridor rail line, which is owned by Amtrak. All development at Millstone, except the training facility, is situated south of this mostly below-grade rail line. An abandoned plant nursery adjoins both sides of the Millstone access road north of the tracks. The transmission lines that connect Millstone to the New England grid along with the switchyard equipment are owned and maintained by the Connecticut Light and Power Company (CL&P). The steel monopole transmission lines and rights-of-way (ROWs) corridor extend northward from the switchyard bordered by forested swaths and cross the Rope Ferry Road west of Gardiners Wood Road. The exclusion area coincides with the site property boundary. The nearest residences are single-family houses that are approximately 732 m (2400 ft) from the reactors.

The Millstone site is underlain by Monson gneiss and Westerly granite. Glacial soils, comprised of rock fragments from clay sized particles to boulders, cover the site. In some areas, fill from the quarry or the construction of Millstone overlies the glacial materials. One such pile is located west of Gardiners Wood Road near the recreational fields. This mound of excavated material, primarily associated with construction activities, occupies approximately 2.2 ha (5.5 ac) and is generally grass covered with some low shrubs. In the early 1980s, Northeast Utilities (NU), then the licensee, used the area to store material excavated during the construction of Millstone Power Station, Unit 3, along with miscellaneous construction debris including concrete and rebar which accounts for the majority of the material forming the mound. In 2000, in connection with the sale of Millstone to Dominion, NU characterized this area and

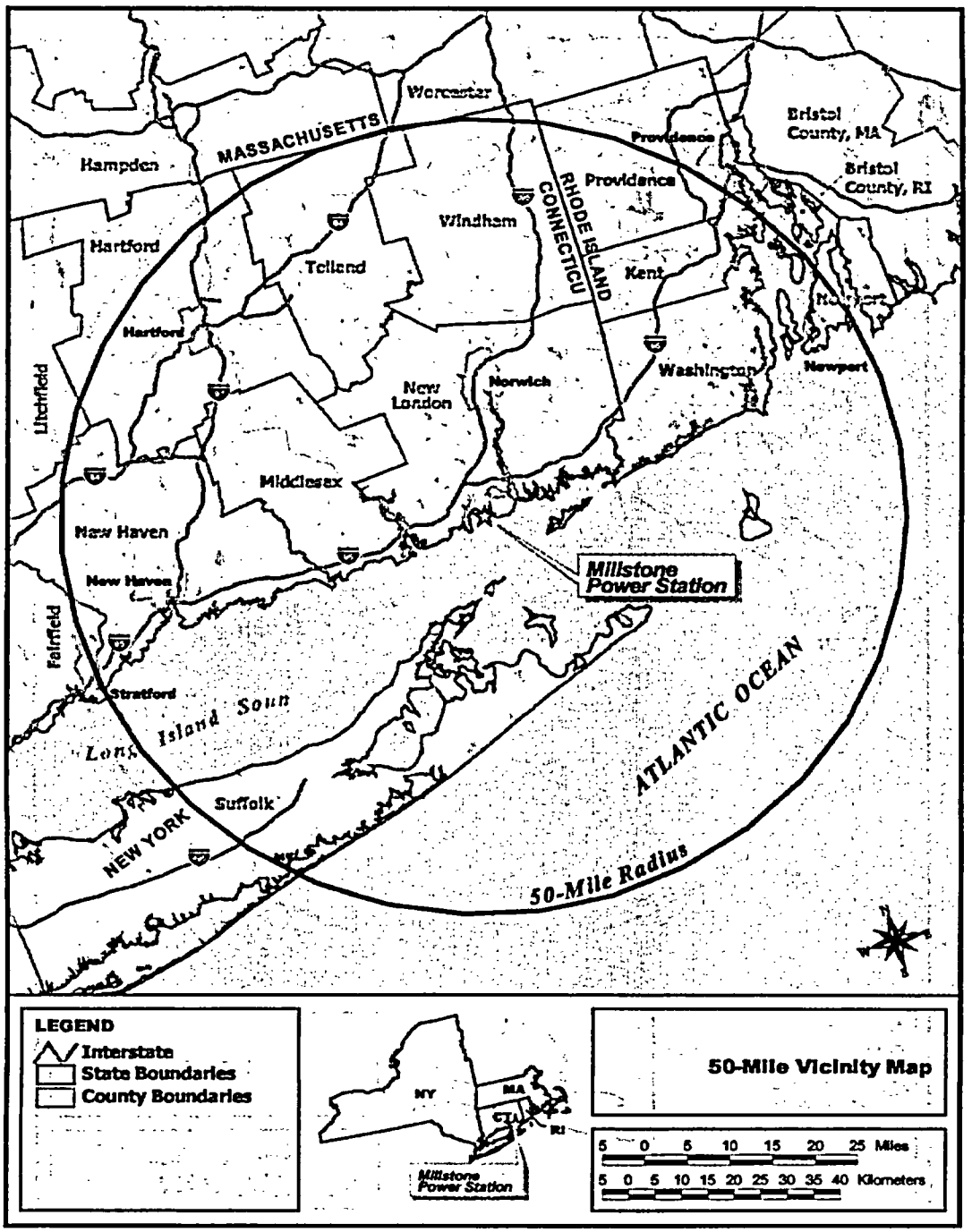

Figure 2-1. Location of Millstone, 80-km (50-mi) Region

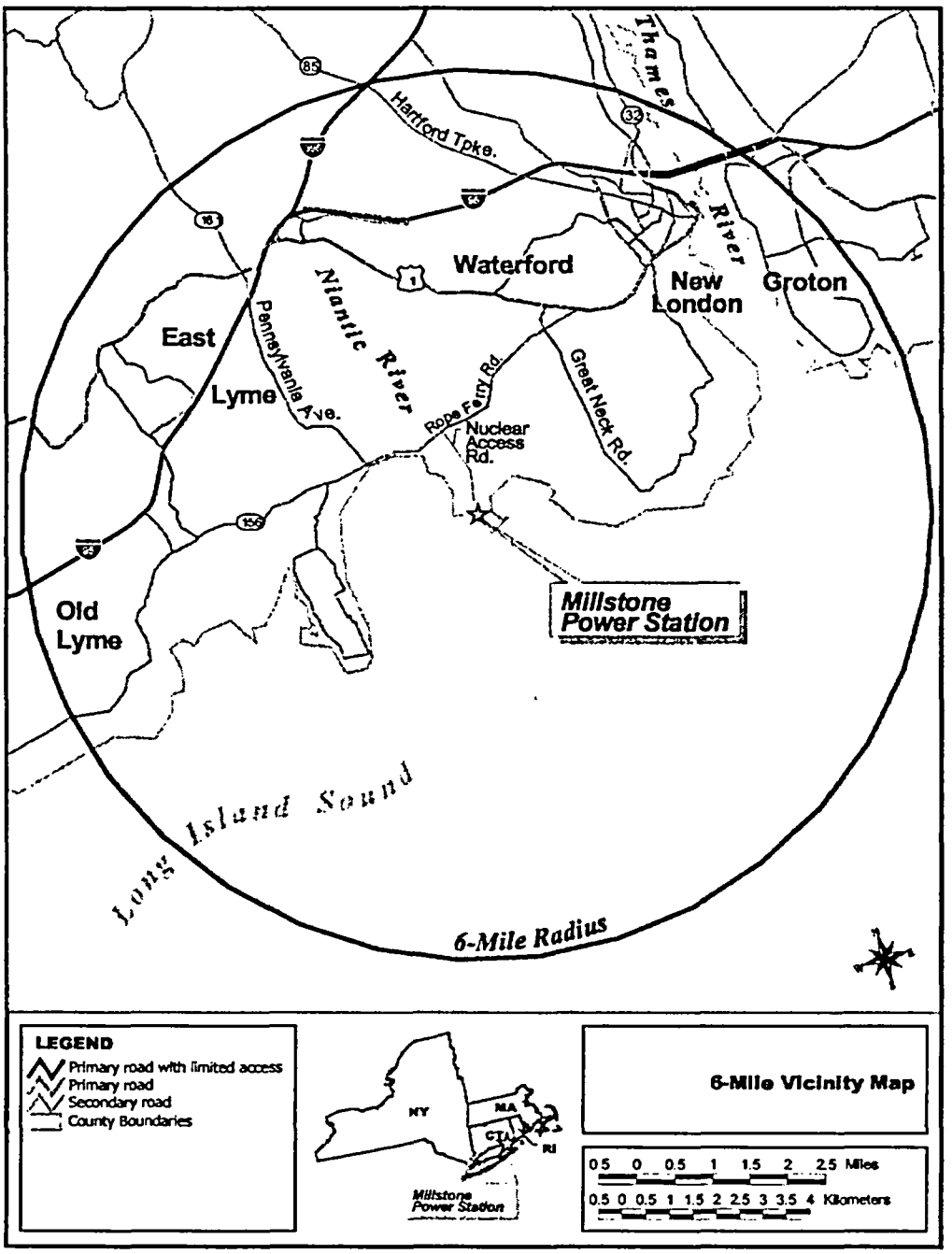

Figure 2-2. Location of Millstone, 10-km (6-mi) Region

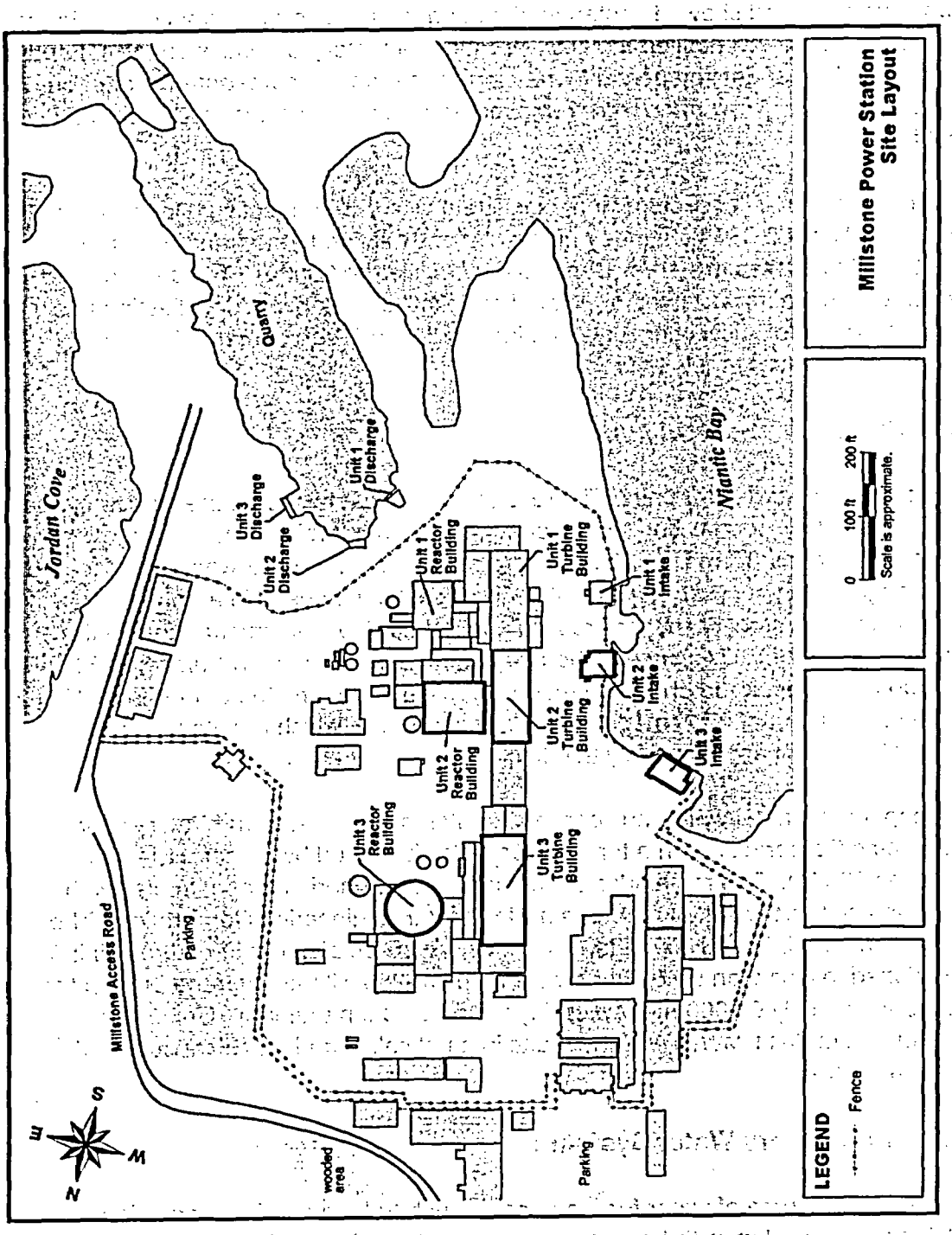

Figure 2-3. Millstone Site Layout

located two drums containing traces of radioactivity. No samples taken in areas outside of where the drums were located showed contamination, and the radioactivity levels of the drums were below reporting limits. NU notified the U.S. Nuclear Regulatory Commission (NRC) and the Connecticut Radiological Environmental Monitoring Office, and a representative of each organization toured the site. The drums were removed and shipped to a licensed low-level waste disposal facility.

Subsequent to the sale of Millstone, Dominion, consistent with the Connecticut Department of Environmental Protection (CTDEP) statutes and regulations relating to the transfer of the facility, has continued to assess this area (Connecticut Legislature 2003a). Tests of soil and ground-water samples have not detected a residual radioactive contamination. Testing has found some limited nonradiological chemical constituents that will require resolution under CTDEP remediation standards regulations.

2.1.2 Reactor Systems

Millstone has two operational reactor units (Figure 2-3). Unit 2 is a two-loop, pressurized-water nuclear reactor furnished by Combustion Engineering, Inc., with a turbine-generator furnished by General Electric Company (Dominion 2004a). The remainder of the unit was designed and constructed with engineering support from Bechtel. The reactor is housed in a double containment consisting of a steel-lined, prestressed concrete cylindrical structure inside the enclosure building. Unit 2 fuel is slightly enriched (less than 5 weight percent) uranium-235 with an average burnup for the peak rod of 62,000 megawatt days per metric ton of uranium. Unit 2 has a licensed thermal output of 2700 megawatts thermal (MW[t]), which results in a net calculated electrical output of approximately 870 MW(e).

Unit 3 is a four-loop, pressurized-water, nuclear reactor steam supply system furnished by Westinghouse Electric Corporation with a turbine-generator furnished by General Electric Company (Dominion 2004a). The remainder of the unit was designed and constructed with architect-engineering support provided by Stone and Webster Engineering Corporation. The reactor is in a steel-lined, reinforced concrete, subatmospheric containment structure. Unit 3 fuel is slightly enriched to less than 5 weight percent uranium-235 with an average burnup for the peak rod of approximately 60,000 megawatt days per metric ton uranium. Unit 3 has a licensed thermal output of 3411 MW(t), which results in a net calculated electrical output of approximately 1154 MW(e).

2.1.3 Cooling and Auxiliary Water Systems

Long Island Sound is the source of water for the once-through turbine condenser cooling systems at Millstone. The system withdraws salt water from Long Island Sound though intakes,

pumps the water through the condenser for cooling, and surface discharges heated water to Long Island Sound approximately 610 m (2000 ft) southeast of the withdrawal points (Dominion 2004a).

Millstone Point is located on the north shore of Long Island Sound. To the west of the site is Niantic Bay and to the east is Jordan Cove (Dominion 2004a). Intake structures for Units 2 and 3 are located on the eastern shore of Niantic Bay, which is fed by Long Island Sound. The structures consist of four reinforced-concrete bays for Unit 2 and six bays for Unit 3. When both Units 2 and 3 are operating at full power, the 10 pumps (one for each bay) pump a total of 92 cubic meters per second (m^3/s) (1.46 million gallons per minute [gpm]) into 2-m (7-ft) diameter conveyance pipes. Cooling water then moves through the condensers. After passing through each unit's condensers, cooling water is discharged to the former granite quarry. The heated discharge water then flows through two cuts excavated from the bedrock at the southern end of the quarry into Long Island Sound. Figure 2-3 shows the intake structures, quarry, and discharge points for the Millstone circulating water system.

The intake structures are designed to minimize the possibility of clogging or impingement of aquatic organisms. Before the intake water reaches the circulating water pumps, the water passes through trash racks consisting of 1-centimeter (cm) (3/8-inch [in.]) thick metal bars spaced horizontally on 5-cm (2-in.) centers. The water then flows through vertical traveling screens with 1-cm (3/8-in.) mesh that prevent debris and large organisms from entering the cooling system. A cutoff wall in front of the intake extends 2.7 m (9 ft) below the surface to prevent surface water debris and organisms from entering the intake. Maximum intake velocities at the coarse bar racks are 0.46 meters per second (m/s) (1.5 feet per second [ft/s]) for Unit 2 and 0.3 m/s (1 ft/s) for Unit 3. Unit 2 has always had 0.953-cm (0.375-in.) mesh continuous-belt traveling screens. Traveling screens associated with Unit 3 initially included 0.4763-cm (0.1875-in.) mesh screens or a combination of two mesh sizes (0.4763 cm [0.1875 in.] and 0.953 cm [0.375 in.]). Since 1992, traveling screens associated with Unit 3 have had a mesh size of 0.953 cm (0.375 in.).

At Unit 2, debris and organisms are washed off the traveling screens into a trough, using a spray-wash pressure of 85 pounds per square inch (psi) (586 kilopascals [kPa]). A fish-return sluiceway pipe was added to Unit 2 and became operational in July 2000 (Dominion 2001). The fish return system takes all impinged material from the Unit 2 screen-wash system and directs the material into the Sound, east between the Units 1 and 2 intake structures.

Unit 3 was constructed with a two-trough fish and trash return, designed as an integral part of the intake screen system. A low-pressure (10 psi [69 kPa]) spray is used to flush organisms off modified-lip baskets on the traveling screen panels into a lower fish sluiceway trough, which discharges into the Sound, eastward along the seawall on the west side of the intake structures.

Remaining material is washed off with pressure spray into an upper trough that empties into trash hoppers for offsite disposal.

Biocides are added to the intake water to prevent biofouling. Sodium hypochlorite is injected on a periodic basis, and the system is designed to maintain a chlorine concentration of 0.2 parts per million (ppm) (Dominion 2004a). Residual chlorine is monitored in the effluent water. Thermal backwashing is also performed to prevent mussels from fouling the intake structure pump bays.

Service water is also withdrawn inside the intake structures. This water is used in a variety of applications, including component cooling (e.g., pump bearings and spent fuel pool water) and as an emergency backup supply for some systems. During normal operations, approximately 3.4 m^3/s (54,000 gpm) of service water is withdrawn for both units.

Domestic-quality potable water, at a flow of about 1.3×10^6 liters per day (L/d) (3.3×10^5 gallons per day [gpd]), is purchased by Dominion from the city of New London for drinking, sanitary purposes, and industrial processes (other than cooling). In the past, Millstone withdrew groundwater from several wells onsite for sanitary purposes, but no longer does. Dominion maintains registrations for these wells. Sanitary waste from Millstone is discharged into the wastewater treatment system operated by the city of New London.

2.1.4 Radioactive Waste Management Systems and Effluent Control Systems

Millstone liquid, gaseous, and solid radioactive waste management systems collect and treat the radioactive materials that are produced as a by-product of plant operations. The Millstone processing systems are designed and operated to meet the dose design objectives of 10 Code of Federal Regulations (CFR) Part 50, Appendix I. Solid radioactive waste is packaged, stored onsite, and ultimately transported to a licensed treatment or disposal facility.

Radioactive material produced from fission of uranium-235 and neutron activation of metals in the reactor coolant system (RCS) is the primary source of liquid, gaseous, and solid waste. The radioactive fission products build up within the fuel. Most of these fission products are contained in the fuel pellets and sealed fuel rods, but small quantities escape from the fuel rods into the reactor coolant. Neutron activation of trace concentrations of metals entrained in reactor coolant such as zirconium, iron, and cobalt creates radioactive isotopes of these metals. Both fission and activation products in liquid and gaseous forms are continuously removed from reactor coolant and captured on several different types of filter media. Units 2 and 3 operate separate liquid and gaseous processing systems. Gaseous discharges for each unit are monitored separately before they are discharged to the stack or to other designated release points for each unit. All liquid discharges are directed to a canal which terminates in the old

quarry and the quarry discharges to Long Island Sound. All interconnections between Units 2 and 3 and Unit 1 were separated as described in *Millstone Power Station, 2002 Radioactive Effluent Release Report* (Dominion 2003b).

The radioactive-waste reduction facility is used for low-level radioactive solid waste processing and storage. Solid waste consists of spent fuel, contaminated equipment and components removed from service, dry active waste, solidified liquid waste, and spent filtration media. Spent fuel is removed from the reactor core and stored in each unit's spent fuel pool. Millstone has constructed a dry cask spent fuel storage facility. Dry active waste includes contaminated protective clothing, paper, rags, and other trash generated during operation and maintenance activities. Filter media include paper and glass fiber cartridge filters, resin beads or powder, and metallic filters. Class A, B, and C solid waste, as defined in 10 CFR Part 61, may be processed for volume reduction or is shipped to a licensed disposal facility. The State of Connecticut, a member of the Southeast Low Level Waste Compact, has access to the Barnwell, South Carolina disposal facility through the renewal period.

The Radiological Effluent Monitoring Offsite Dose Calculation Manual (REMODCM) provides the sampling and analysis requirements and the methods used for calculating the concentration of radioactive material in effluents and the estimated offsite doses (Dominion 2005). The REMODCM also provides guidelines for operating radioactive waste treatment systems and instrumentation in order that offsite doses are kept as low as reasonably achievable (ALARA). Each unit's specifications for the minimum number of operable effluent monitors, alarm set points, monitoring instrumentation surveillance requirements, and required actions if the required monitors are not in service are listed in the REMODCM. *Radioactive Effluent Release Reports* (Dominion 2002b; Dominion 2003b; Dominion 2004c) for 2001, 2002, and 2003 were reviewed. Data from the 2002 report were used to represent a typical year for capacity factors and operational events that impact the volume and activity of liquid, gaseous, and solid waste.

2.1.4.1 Liquid Waste Processing Systems and Effluent Controls

The liquid waste systems and effluent controls for Millstone Units 2 and 3 have the same general design and operation. There are two separate trains—one for normally tritiated, nonaerated, low-conductivity liquid waste associated with the primary coolant system and the other for all other aerated liquid wastes that are collected by the open drain systems. The primary liquid waste system contains higher radioactivity levels than are found in liquids collected from open drains. Processing of primary liquid waste occurs on a batch basis. The processing of the primary waste consists of filtration, degasification (when needed for shutdown) and ion exchange. Processed wastes are collected in monitor tanks, which are sampled prior to release. A radiation monitor in the discharge line records activity released and alarms if the activity level in the effluent exceeds predefined limits. A valve in the discharge line

is actuated on a high-level alarm to terminate the release to the circulating water discharge tunnel. Both Units 2 and 3 have continuous releases from steam generator blowdown and service water and from turbine building sump discharge pathways and batch releases from low-activity liquid waste tanks. Some of the low-activity liquid waste streams, such as turbine building floor drains and steam generator blowdown, are sampled, monitored, and discharged directly to the environment during normal operations. The waste-processing systems for aerated drains, equipment drains, and sumps, although different for each unit, provide for sampling, continuous monitoring, and where appropriate, automatic termination of releases (Dominion 2004d).

Each liquid waste pathway has specific sampling, analysis, monitoring points, alarms, and operational parameters listed in the REMODCM. The REMODCM prescribes the alarm / trip points, which are based on 20 percent of the radiological effluent control limit (Dominion 2005). The radioactivity released from each batch release or continuous release is recorded and reported annually to the NRC. During 2002, there were a total of 344 batch releases of liquid effluents and the volume of batched plus continuous releases was 3.34×10^7 liters (L) (8.82×10^6 gallons [gal]) for Unit 2 and 1.78×10^7 L (4.70×10^6 gal) for Unit 3. Total fission and activation products released were 2.99×10^9 becquerels (Bq) (0.0809 curies [Ci]) for Unit 2 and 5.51×10^9 Bq (0.149 Ci) for Unit 3. Total tritium activity released was 7.66×10^{12} Bq (207 Ci) from Unit 2 and 4.92×10^{13} Bq (1330 Ci) from Unit 3 (Dominion 2003b). These releases are typical of annual releases from Millstone and are not expected to increase during the renewal period. These releases result in doses to members of the public that are well below the dose design objectives of 10 CFR Part 50, Appendix I, as discussed in Section 2.2.7.

2.1.4.2 Gaseous Waste Processing Systems and Effluent Controls

The Millstone waste-processing systems are designed to meet 10 CFR Part 20 and 10 CFR Part 50, Appendix I. Unit 2 processes waste gases from the RCS by storage, decay, and particulate filtration. Unit 3 processes gases removed from the RCS through a series of filter banks designed to delay noble gases and capture radioiodine. Monitors record the concentration of particulate, iodine, and noble gases released. Sampling and analysis used to identify and quantify isotopes are described in the REMODCM (Dominion 2005).

In Unit 2, process waste gases from the RCS are compressed and collected in six tanks. The six tanks provide adequate storage capacity for a decay time of 90 days. The waste-gas decay tanks are sampled prior to release and discharged through a filter to the stack. The discharge pipe contains a radiation monitor and redundant isolation valves. A high-level alarm will automatically close an isolation valve to terminate the release. Both Air Ejector and Auxiliary Building roof vents are separate monitored release paths. Containment ventilation is processed through a HEPA (high efficiency particulate air) filter and a charcoal filter and monitored prior to

release in the stack. Auxiliary building, fuel building, and containment purge exhaust is processed through a HEPA filter and monitored prior to release at the enclosure building roof vent (Dominion 2004d).

For 2002, Unit 2 total fission and activation gas activity released was 4.74×10^{12} Bq (128 Ci), iodine-131 was 1.81×10^{8} Bq (4.90×10^{-3} Ci), particulates were 4.5×10^{5} Bq (1.22×10^{-5} Ci), and tritium was 1.15×10^{12} Bq (31.2 Ci) (Dominion 2003b). Historically, releases of noble gases and radioactive iodine from Unit 2 have been higher than from Unit 3 (Dominion 2003b).

Unit 3 has two separate systems for waste-gas collection and discharge. Process gas from the RCS and its support systems is passed through and filtered by charcoal bed adsorbers and HEPA filters. The charcoal adsorbers hold up noble gases long enough in comparison to their half-lives so that most of these radioisotopes are effectively removed by radioactive decay. Radioactive iodine is removed by the charcoal beds and a small quantity of noble gases are released to the stack. The process vents are designed to collect the low-activity aerated gas streams from drains, condenser air, containment vacuum system, and some of the relief valve discharges. Exhausts from the containment, fuel auxiliary, and waste-disposal buildings can be discharged directly to the reactor plant ventilation vent or processed through a HEPA / charcoal filter bank. Vents in the turbine building, steam generator blowdown tank, and safeguards building exhaust to the atmosphere during normal operations (Dominion 2004d).

For 2002, Unit 3 total fission and activation gas activity released was 9.07×10^{10} Bq (2.45 Ci), iodine-131 was 5.62×10^{4} Bq (1.52×10^{-6} Ci), particulates were 2.25×10^{6} Bq (6.08×10^{-5} Ci), and tritium was 1.75×10^{12} Bq (47.3 Ci) (Dominion 2003b). These releases from both units are typical of annual releases from Millstone and are not expected to increase during the renewal period. These releases result in doses to members of the public that are well below the dose design objectives of 10 CFR Part 50, Appendix I, as discussed in Section 2.2.7.

2.1.4.3 Solid Waste Processing

The radioactive solid waste systems are designed to collect, hold, process, dewater, solidify, package, and store waste until shipment off site. Volumes, activity levels, and number of shipments are reported in the *Radioactive Effluent Release Reports* (Dominion 2003b). Solid-waste containers, shipping casks, and methods of packaging meet applicable NRC and Department of Transportation regulations (10 CFR Part 61, 49 CFR Parts 171–178). Materials processed as solid waste include the following: concentrated boric acid, spent resin, spent filter cartridges, sludges, and miscellaneous dry active wastes. Contaminated structures, equipment, and components are processed for volume reduction or prepared for direct disposal at one of the licensed low-level waste disposal facilities. Spent resins and filter media contain the highest concentration of radioactive material and require special handling and solidification.

Dry active waste consisting of paper, personnel protective clothing, rags, mops, etc., is sorted and compacted. An offsite vendor may be used for further volume reduction (Dominion 2004d).

The condensate polishing facility processes spent condensate resin and is also used for storing mixed waste. Spent resins are generated from demineralizers in the radioactive waste systems, the chemical and volume control system, and the spent fuel pool clean-up system. The radioactive waste storage facility and the onsite storage containers are used to store liners that contain higher-activity waste such as dewatered resin and filters. The radioactive waste storage facility is also used for sorting, processing, loading, and shipping radioactive materials. Temporary waste storage containers are shielded to protect operating personnel (Dominion 2004d).

All radioactive waste is shipped to a licensed burial site in accordance with applicable NRC, U.S. Department of Transportation, and U.S. Environmental Protection Agency (EPA) regulations, including burial site regulation requirements. The quantities shipped off site for processing and burial are reported to the NRC in the *Annual Radioactive Effluent Release* (Dominion 2003b). In 2002, Millstone made a total of three low-level waste shipments, two mixed waste shipments, one low-level waste shipment of spent resin, and 14 shipments of water, dry active waste, contaminated equipment, or sludges. Unit 2 solid waste volume was 345 m^3 (1.22×10^4 ft^3) and the total activity was 1.30×10^{12} Bq (35.2 Ci) and Unit 3 solid waste volume was 243 m^3 (8580 ft^3) and 2.80×10^{12} Bq (75.6 Ci) (Dominion 2003b). These solid waste volumes and amounts of radioactive material are typical of annual waste shipments for both Millstone units and are not expected to increase during the renewal period.

2.1.5 Nonradioactive Waste Systems

Hazardous, nonradioactive waste is regulated under the Resource Conservation and Recovery Act (RCRA), administered by the CTDEP, which classifies Dominion as a large-quantity generator. Dominion operates under interim RCRA status (EPA ID # CTD00084518) while its permit application is being reviewed. Dominion currently is not considered to be a significant noncomplier (EPA 2004a; CTDEP 2004).

Millstone uses licensed commercial haulers for its solid and hazardous wastes. Common types of hazardous, nonradioactive waste generated at Millstone are aerosol cans, paint-related waste materials, and solvent rags.

2.1.6 Plant Operation and Maintenance

Routine maintenance performed on plant systems and components is necessary for safe and reliable operation of a nuclear plant. Maintenance activities conducted at Millstone include

inspection, testing, and surveillance to maintain the current licensing basis of the plant and to ensure compliance with environmental and public safety requirements. Certain activities can be performed while the reactor is operating. Others require that the plant be shut down. Dominion refuels Millstone on an 18-month schedule. Up to 700 to 800 additional contractor employees are employed for the approximately 30-day refueling outage (Dominion 2004a).

Millstone performed an aging management review and developed an integrated plant assessment for managing the impacts of aging on systems, structures, and components in accordance with 10 CFR Part 54. The aging management program is described in Section 3 of the Environmental Report (Dominion 2004a). The integrated plant assessment identified the programs and inspections that are managing the impacts of aging at Millstone. The integrated plant assessment did not identify any need for additional refurbishment or replacement activities. Dominion assumes that an additional five employees will be needed to perform all the necessary surveillance, monitoring, inspections, testing, trending, and record-keeping activities during the license renewal period.

2.1.7 Power Transmission System

Four 345-kilovolt (kV) transmission lines connect Millstone to the power grid (Table 2-1) (Dominion 2004a). The four lines share a common ROW for 14.5 km (9 mi) north to Hunts Brook Junction. At Hunts Brook Junction, two lines run north to the Card Street and Manchester substations, one line runs east to the Montville station, and one line runs west to the Southington substation (Figure 2-4). All Millstone lines share ROWs with lines from other sources and would be maintained regardless of continued Millstone operation status.

Table 2-1. Millstone Transmission ROWs

		Length		Width		Max Area[a]	
Substation	kV	km	(mi)	m	(ft)	ha	(ac)
Hunts Brook Junction	345	14.5	(9)	152	(500)	220	(545)
Montville	345	6.4	(4)	99	(325)	64	(158)
Card Street	345	32	(20)	91	(300)	294	(727)
Manchester	345	61	(38)	91	(300)	559	(1382)
Southington	345	71	(44)	76	(250)	539	(1333)

(a) Max area calculations use maximum ROW width estimates.

The 14.5-km (9-mi) common ROW leading out of Millstone to Hunts Brook Junction is approximately 152 m (500 ft) wide and covers a maximum of 220 ha (545 ac). The line from

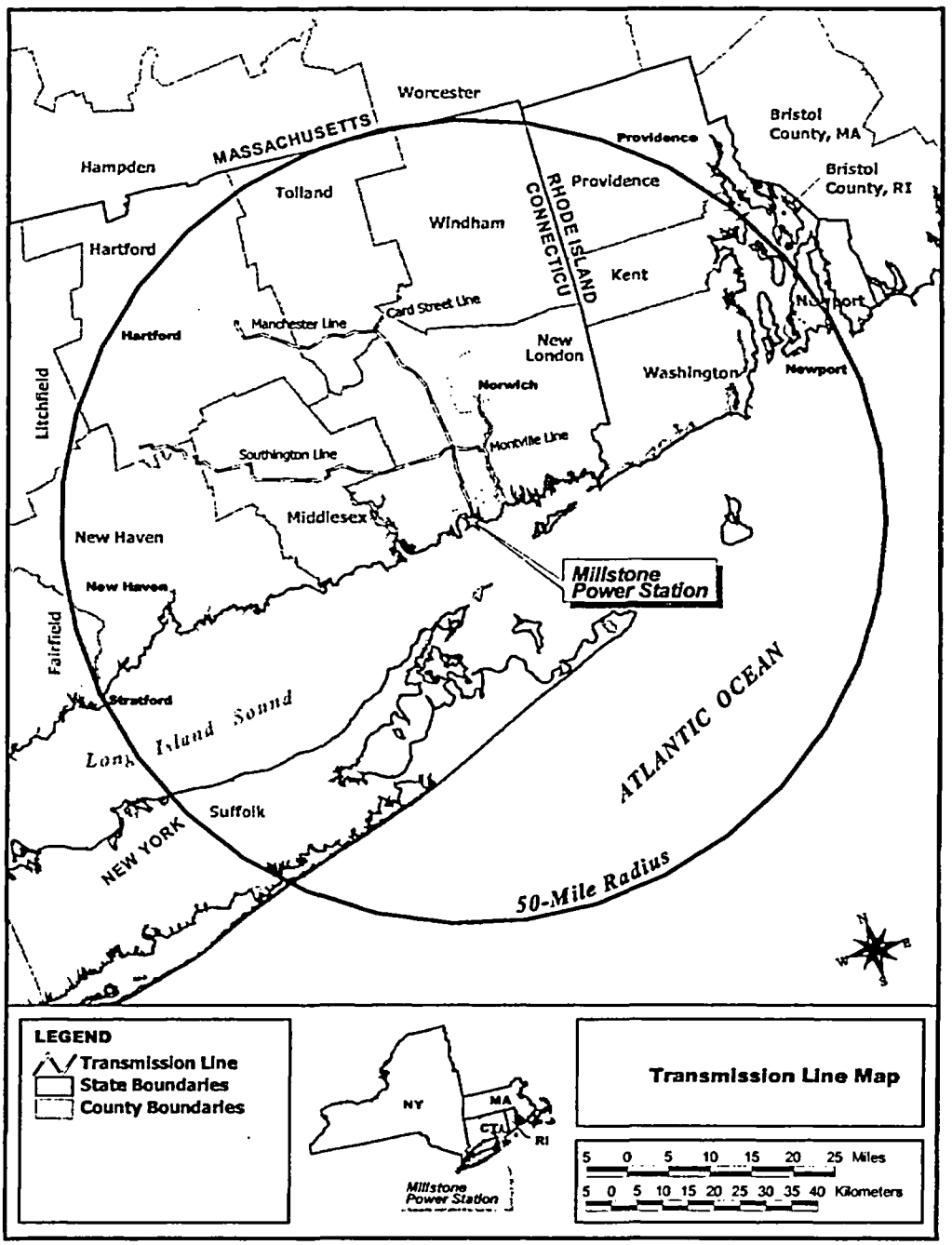

Figure 2-4. Millstone Transmission Lines

Hunts Brook Junction to the Montville station is approximately 6.4 km (4 mi) long and 99 m (325 ft) wide for a maximum area of 64 ha (158 ac). The line to the Card Street substation is approximately 32 km (20 mi) long and 91 m (300 ft) wide for a maximum area of 294 ha (727 ac). The Card Street line shares most of its length with the Manchester line. The line to the Manchester substation is approximately 61 km (38 mi) long and 91 m (300 ft) wide for a maximum area of 559 ha (1382 ac). The line to the Southington substation is approximately 71 km (44 mi) long and 76 m (250 ft) wide for a maximum area of 539 ha (1333 ac).

CL&P manages vegetation within the four transmission line ROWs with an approach it calls "two-zone maintenance" (NUSCO 2004). The area directly beneath the transmission lines and extending out 4.6 m (15 ft) in either direction is called the "wire zone." Most vegetation in the wire zone is kept short except for the occasional clusters of red cedar (*Juniperus virginiana*) that are maintained for nesting habitat. The area from the edge of the wire zone to the outside edge of the ROW is called the "side zone." The side zone acts as a transition between the low structure of the wire zone and the forest. The side zone is maintained as a multi-layered habitat with low-growing trees and shrubs.

Vegetation is managed through a combination of mowing, trimming, and herbicide treatments. All personnel applying herbicides are required to possess a valid applicator's license (NUSCO 2004). Wetlands and other water bodies are protected from herbicides by a 3-m (10-ft) border (NUSCO 2004). Mowing is conducted only between the months of November and April to minimize impacts to wet soils, nesting birds, and wildlife forage. CTDEP reviews all transmission line ROW management plans to ensure protection of threatened and endangered species. CL&P personnel work closely with crews to ensure that transmission line maintenance is implemented properly.

CL&P encourages collaboration with conservation groups to use transmission line ROWs for wildlife habitat improvement. CL&P has also developed a list of plant species and wildlife habitat types that it attempts to promote through its vegetation management actions (Ferrucci and Walicki 2002). Contractors are required to identify and target non-native, invasive plant species for eradication (Ferrucci and Walicki 2002).

2.2 Plant Interaction with the Environment

Sections 2.2.1 through 2.2.8 provide general descriptions of the environment near Millstone as background information. They also provide detailed descriptions when 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

The Millstone site is approximately 212 ha (525 ac), including the developed area that is approximately 89 ha (220 ac). The lands at Millstone are designated as "public utility" on the 1996 *Existing Land Use* map for Waterford. They are within an industrial zone south of the Amtrak Northeast Corridor rail line, and are within an industrial park zoning district north of the rail lines. Waterford's *Future Land Use Plan* map calls out the Millstone site as an "electric generation facility." The plan specifies that this land use applies to "The area presently devoted to use by Millstone and associated facilities necessary for the generation and transmission of electricity." Also shown on the *Future Land Use Plan* map at Millstone are lands on the site designated for "natural resources." The plan notes that these are "areas that exhibit significant environmental constraints . . . and that represent the highest priorities for conservation. Use of these areas should be generally restricted or discouraged." These areas include wetlands and coastal resource areas. The entire shoreline of Millstone and of Waterford is considered a scenic area according to the Waterford Plan. The Coastal Boundary established by the 1982 Municipal Coastal Program (pursuant to Connecticut General Statutes Section 22a-94) encircles all of Millstone Point and includes offshore waters and lands within about 305 m (1000 ft) of the shore. Restoring freshwater wetlands at Millstone Point is encouraged by the plan. Adjacent land uses (existing and future) are shown for waterfront business development, residential, open space, and power transmission (Waterford 1998).

The current land uses on the land abutting the Millstone site are nearly exclusively single-family residential neighborhoods. A large undeveloped tract of forested private land that is also zoned for single-family residential uses abuts the site to the east of the recreation fields across Gardiners Wood Road. There is a small eighteenth century burial ground that abuts the site to the north and fronts Rope Ferry Road. A convalescent residential care center is located across from the main entrance to Millstone on the north side of Rope Ferry Road. The nearest commercial areas are found nearly 5 km (3 mi) away, where there are several small shopping centers and stand-alone retail establishments at Jordan Village, which is also the center for town government and the location of the high school. Maritime enterprises that cater to small fishing and pleasure craft are found at Mago Point about 1 km (0.6 mi) from Millstone.

Section 307(c)(3)(A) of the Coastal Zone Management Act [16 United States Code (USC) 1456(c)(3)(A)] requires that applicants for Federal licenses to conduct an activity in a coastal zone certify that the proposed activity is consistent with the enforceable policies of the State's coastal zone program. A copy of the certification is also to be provided to the State. The State is to notify the Federal agency whether the State concurs with or objects to the applicant's certification. This notification is to occur within 6 months of the State's receipt of certification. The Millstone plant is within Connecticut's coastal zone for purposes of the Act. Following submission of the Dominion certification of consistency, CTDEP waived a separate Federal

coastal consistency review. CTDEP has stated that it will evaluate consistency for the renewal of the OLs for Millstone in conjunction with the State's National Pollution Discharge and Elimination System (NPDES) permit review process (CTDEP 2004b). A copy of this letter is in Appendix E of this Supplemental Environmental Impact Statement (SEIS).

2.2.2 Water Use

Millstone receives water from the city of New London for potable and service uses at the plant. This freshwater is derived from the Lake Konomoc reservoir, located in Waterford and Montville on the mainland. Current plant usage averages approximately 1.3×10^6 L/day (3.3×10^5 gpd). The usage represents approximately 5.2 percent of the city of New London's daily capacity and 6 percent of the city's average daily use (Dominion 2004d). In the past, Millstone withdrew groundwater from three wells onsite for sanitary purposes, but no longer does so. However, registrations for these wells are maintained. Sanitary wastes generated at Millstone are discharged into the New London wastewater treatment facility.

Noncontact cooling water for Millstone Units 2 and 3 is withdrawn by Millstone from Long Island Sound. Additional minor amounts of ocean water may be used as emergency backup for fire protection and other systems. The water withdrawn from Long Island Sound represents about 3 percent of the mean tidal flow estimated for the Niantic Bay in the vicinity of Millstone (Dominion 2004d). The quantity of fresh water flow into Niantic Bay or Jordan Cove is not gauged (U.S. Geological Survey 2004), but is small relative to the estimated tidal exchange volumes. Dye tracer studies conducted in 1988 concluded that about 20 percent of the Niantic River discharge flow is withdrawn by Millstone during three-unit operation (Dominion 2004e). It is estimated that current two-unit operation results in the withdrawal of approximately 15 percent of Niantic River discharge. After passing through the condensers and service water system, most of the Millstone cooling water is returned to Long Island Sound.

The Millstone site has several shallow wells near it, the nearest being 0.5 km (0.33 mi) from the station proper (Dominion 2004d). None of these wells provide water for domestic purposes, but two shallow wells in the northern part of the site were used to irrigate ball fields and supply concession stands at the field. In 2001, the concession stands were connected to a municipal water supply, and one of the two wells was filled in and abandoned. The remaining well is pumped seasonally. Because of its shallow depth of 6.7 m (22 ft) and pump size, Dominion has estimated its pumping capacity to be much less than 379 L per minute (100 gpm) (Dominion 2004a).

The ground-water environment at Millstone is characterized by generally impermeable bedrock (gneiss and granite) overlain by glacial tills and soil of varying permeabilities (Dominion 2004d). There appears to be little movement of water through fractures in the bedrock because the

quarry did not fill with either fresh or salt water after its abandonment in 1960 (Dominion 2004d). A ground-water contour map of the site indicates that the ground-water table is highest in the northern part of the site and slopes gradually towards the shoreline (Dominion 2004d). Therefore, groundwater at the ball field area is hydraulically upgradient of the station proper.

2.2.3 Water Quality

In accordance with the Federal Water Pollution Control Act (also known as the Clean Water Act), the water quality of plant effluent discharges is regulated through the NPDES. CTDEP is the agency delegated by the EPA to issue discharge permits in Connecticut. Dominion holds an NPDES permit (CT0003263) for cooling system discharges and several other plant and storm water discharges. The NPDES permit sets limitations on water quality in effluent discharges and establishes specific monitoring requirements and the reporting frequency. The most recent NPDES permit, issued in 1992, remains in effect because a timely renewal application was filed by the licensee with CTDEP in 1997. Until the new permit is issued, Dominion will continue to operate under the requirements of the 1992 permit.

The current permit requires monitoring of discharges from the circulating cooling water system, house service boiler blowdown system, the high-conductivity water tank discharge system (including steam generator blowdown), and the radiation waste holdup and treatment system. Discharge limitations vary with location, and include flow, maximum discharge temperature, incremental temperature difference, chlorine, boric acid, oil and grease, suspended solids, pH, iron, copper, zinc, and chromium. Impacts to Long Island Sound are also considered in the permit, for parameters such as odor, coliform bacteria, and dissolved oxygen. There have been occasional instances when monitoring results have been above permit limits (e.g., total suspended solids). These instances have been reported in Millstone's monthly discharge monitoring reports to CTDEP. In addition to requiring chemical specific testing, the NPDES permit also requires testing of discharges for biological toxicity. The testing has shown no significant biological toxicity.

At full discharge flow, water temperatures increase approximately 9 to 14 degrees celsius (°C) (17 to 26 degrees fahrenheit [°F]) as the water crosses the condensers. The NPDES permit for Millstone limits the discharge temperatures to 40 °C (105 °F) and the maximum increases in temperature at the quarry cut to 18 °C (32 °F) above intake temperatures at full flow. The discharge is not allowed to increase the temperature of Long Island Sound beyond an 2438-m (8000-ft) radius mixing zone by more than an average of 2.2 °C (4 °F) or above 28 °C (83 °F). Monitoring data indicate that the thermal plume is warmest in the immediate vicinity of the quarry cuts and the surface-oriented plume from three-unit operation was shown to cool to less than 2.2 °C (4 °F) above ambient temperatures within approximately 1100 m (3610 ft) of the quarry (Dominion 2004e).

Total residual chlorine concentrations in the discharge at the quarry cut must not exceed 0.1 milligrams per liter (mg/L) (0.1 parts per million [ppm]), according to the NPDES permit. Detectable concentrations of free available chlorine may be present for no more than two hours per unit in any one day. Millstone is expected to remain in compliance with the permitted chlorine concentrations.

2.2.4 Air Quality

Millstone has a continental climate modified by marine influences. The northeastern U.S. climate is influenced heavily by the upper level westerlies that prevail at the earth's middle latitudes. Large-scale air masses and storm systems normally approach the area from southwesterly through northwesterly directions, particularly in the colder seasons when the jet stream steers storms along preferred storm tracks that cross New England. The influence of the ocean and Long Island Sound moderates the climate on more local scales. Temperatures along the coast tend to be less extreme than in inland areas, and the humidity tends to be higher. Warmer temperatures along the coast in winter can contribute to snowstorms changing to rain, resulting in proportionately lower observed snowfall totals and greater rain amounts as compared to inland areas. Differential heating of the ocean and land surfaces leads to localized, diurnal sea and land breezes, particularly in the warmer seasons. Proximity to the ocean sometimes contributes to two types of less frequent, but violent storms. Tropical storms or hurricanes can occasionally make their way up the Atlantic seaboard from the south and deliver strong winds and heavy rains to New England coastal locations in the summer and autumn months. Also, the relatively warm ocean waters off the east coast in winter can provide the energy for explosive growth of extratropical cyclones, many producing "northeasters" in New England, leading to strong winds and heavy precipitation. Because of Millstone's proximity to the ocean, the National Weather Service observing station at Bridgeport, Connecticut can be expected to experience a climate very similar to Millstone and can be used to represent long-term weather statistics at Millstone. Bridgeport is also located near the coast, approximately 97 km (60 mi) west of Millstone.

Climatological records from 1971 to 2000 at Bridgeport (National Oceanic and Atmospheric Administration [NOAA] 2003a) indicate that the normal daily maximum temperatures for the area range from 2.7 °C (36.9 °F) in January to 27.7 °C (81.9 °F) in July. Normal minimum temperatures range from -5.1 °C (22.9 °F) in January to 18.9 °C (66.0 °F) in July. The prevailing wind direction, based on a 15-year period of record (NOAA 2003), at Bridgeport for the months of November through January is from the west-northwest. The prevailing direction in February and March is from the northwest, while wind direction from April through October is mostly southwesterly.

Comparison of meteorological data collected at Millstone to data collected at Bridgeport during the years 1974 to1980 (Dominion 2004a) indicates that there are differences in the sea breeze characteristics between these two locations. Onshore flows at both sites tended to occur more frequently in the south-southwest to west direction than in the east-southeast to south direction. However, onshore winds from the east-southeast to south direction did occur more frequently at Millstone than at Bridgeport. Offshore flows from the west-northwest to north direction were recorded more frequently than winds from the north-northeast to east direction at both sites, with north-northeast to east winds occurring slightly more frequently at Bridgeport than at Millstone. In general, monthly average temperatures tended to be cooler at Millstone, particularly during the summer. Also, humidity tended to be lower at Millstone in the warmer months and was generally higher in the cooler months. This comparison is not rigorous and can only be used as a qualitative measure of relative difference between Millstone and the climate record at Bridgeport. The differences that exist in instrumentation type and height and frequency of observations, together with the short time frame of the comparisons (7 years) do not permit quantitative comparisons.

Precipitation in Connecticut is evenly distributed throughout the year and average annual snowfall is the lowest near the coast (Connecticut State Climate Center 2004). Normal annual precipitation at Bridgeport is 1120 millimeters (mm) (44.15 in.), with the lowest monthly mean of 74 mm (2.92 in.) in February, and the highest monthly mean of 105 mm (4.15 in.) in March (NOAA 2003a). Normal annual snowfall at Bridgeport is 64 mm (25.2 in.). Measurable snowfalls typically occur in the months of November through April.

Thunderstorms occur most often in the summer months with an average of 20.3 thunderstorms at Bridgeport, annually, based on a 40-year period of record (NOAA 2003a). The probability of a tornado striking the site is 1.28×10^{-4} per year, based on statistics from the years 1955 through 1983 (Ramsdell and Andrews 1986). During the years between 1900 and 2000, there were eight direct-hitting hurricanes on the coast of Connecticut. Three of these were considered major hurricanes (Jarrell et al. 2001). Category 3 and higher hurricanes are considered major hurricanes.

Wind energy potential along the coast of Connecticut is rated as wind Class 3 on a scale of 1 to 7 (Elliot et al. 1986). These ratings indicate that wind is potentially viable as an energy resource in this area.

Millstone is located in New London County, which is part of the Eastern Connecticut Intrastate Air Quality Control Region (40 CFR 81.183). The entire state of Connecticut has been designated as an attainment area for carbon monoxide, nitrogen dioxide, lead, and sulfur dioxide. New London County is also designated as in attainment for particulate matter with a

diameter of 10 micrometers (μm) or less. New London County has been designated as serious nonattainment for the EPA 1-hour ozone standard (40 CFR 81.307, CTDEP 2002a).

Diesel generators, boilers, and other activities and facilities associated with Millstone emit various nonradioactive air pollutants to the atmosphere. Air emissions from these sources are subject to Connecticut General Statutes, various sections of the Regulations of Connecticut State Agencies, Title 22a-174, (Connecticut Legislature 2003b), and various Federal regulations. Emissions from these sources are regulated under permit number 199-0038-TV, which was issued January 29, 2003, and expires January 29, 2008.

2.2.5 Aquatic Resources

Millstone is located at Millstone Point, a small peninsula situated on the north shore of Long Island Sound in Waterford, Connecticut. The plant is bordered on the west by Niantic Bay, on the east by Jordan Cove, and on the south by the Twotree Island Channel (Dominion 2004e) (Figure 2-5). The plant is located approximately 1.6 km (1 mi) southeast of the mouth of the Niantic River and approximately 5.6 km (3.5 mi) west of the Thames River. Cooling water intake structures are located in Niantic Bay and are situated approximately 4.6 to 7.6 m (15.1 to 24.9 ft) below mean sea level. Three separate intakes, one for each unit, are located along a 200-m (656-ft) stretch of shoreline on the western boundary of Millstone Point. The Unit 1 intake is no longer used because the unit has permanently ceased operation.

Dye studies conducted by the Massachusetts Institute of Technology in 1975 and 1976, prior to the operation of Unit 3, and again in 1988, suggested that about 20 percent of the water discharged from the Niantic River could be withdrawn by the Millstone cooling water system with three-unit operation and about 15 percent with only Units 2 and 3 operating (Lorda et al. 2000; Dimou and Adams 1989). Once-through cooling water is discharged into an abandoned granite quarry located approximately in the center of Millstone Point. Water then flows into Long Island Sound near the Twotree Island Channel (see Figure 2-5). The maximum allowed daily flow of the discharges is 1.0×10^{10} L/d (2.7×10^{9} gpd). The current NPDES permit limits the maximum temperature of the discharge points at the quarry cut to 40.6 °C (105 °F), with a maximum temperature increase of 17.8 °C (32 °F) above the intake water temperature under normal conditions.

2.2.5.1 General Water Body Characteristics

Long Island Sound is a large water body, comprising 3419 square kilometers (km^2) (1320 square miles [mi^2]), with 966 km (600 mi) of coastline. The drainage area associated with the water body is approximately 43,564 km^2 (16,820 mi^2). The average depth of the Sound

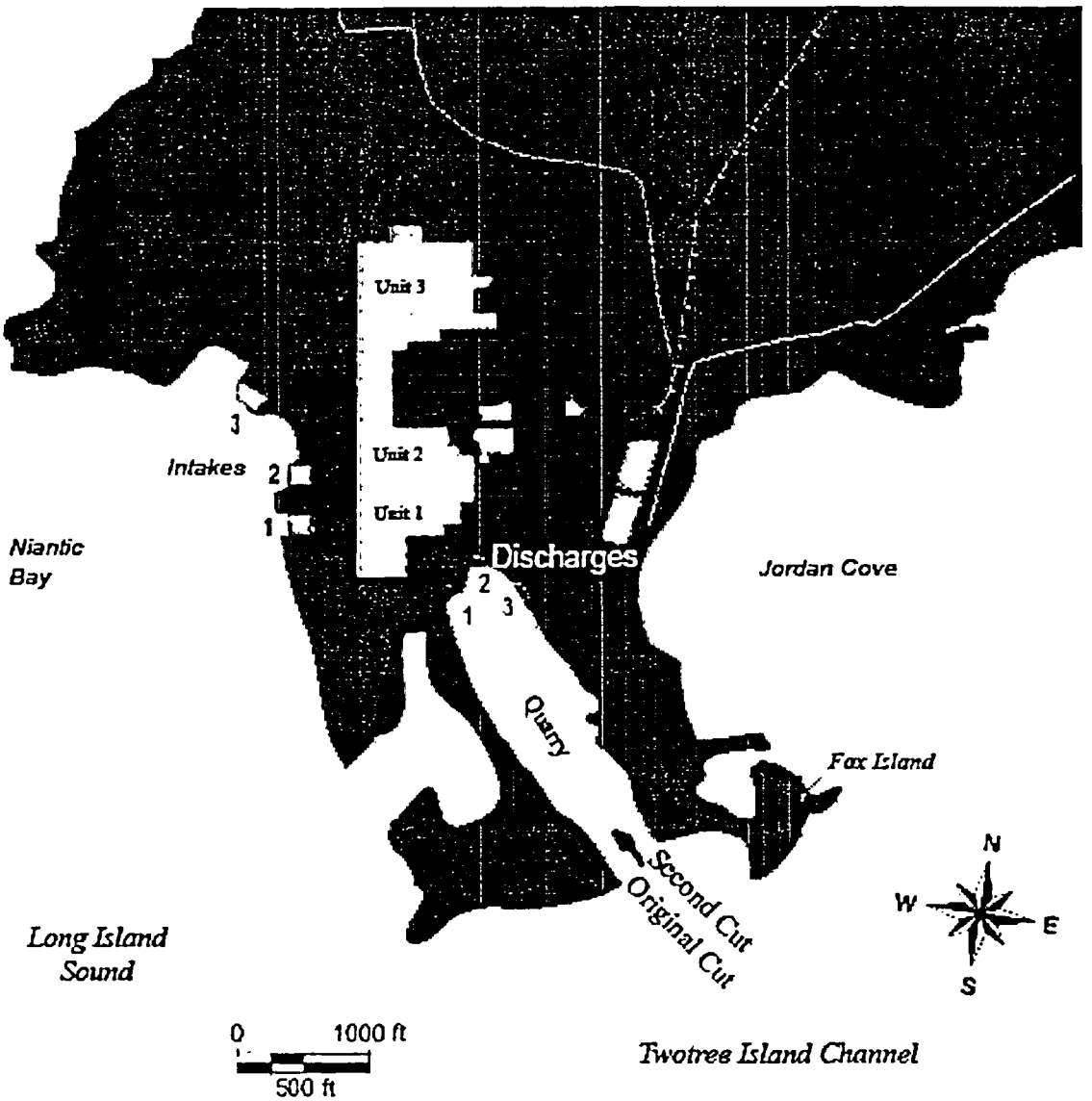

Figure 2-5. Millstone Point, Location of Millstone Cooling Water Intakes and Discharges

is 19 m (63 ft), and the approximate volume is 68 trillion L (18 trillion gal). It is estimated that 20 million people live within 80 km (50 mi) of the Sound (EPA 2004b).

Millstone Point is located on the eastern end of Long Island Sound, near the mouth of the Sound. This area of Long Island Sound has a salinity of approximately 26 to 30 parts per thousand. Salinity is influenced by the presence of three major rivers: the Thames, the

Housatonic, and the Connecticut. The Thames and Connecticut rivers flow into the Sound in the vicinity of the site. Ambient water temperature near Millstone cooling water intakes can range from 1.0 to 22.0 °C (33.8 to 71.6 °F) over the course of a year. Linear regression performed on regional daily and annual seawater temperatures over a 25-year period revealed a significant increase in water temperature of 1.55 °C (2.8 °F) based on daily means and 1.01 °C (1.8 °F) based on annual means (Keser et al. 2003). Millstone Point is situated approximately 5.6 km (3.5 mi) west of the Thames River, in an area that experiences strong tidal currents that influence the nearshore ecosystem, which includes rocky coastlines and boulder and gravel substrate beaches. The ecosystem supports a variety of fish, invertebrates, and marine plant life. The average tidal flow through Twotree Island Channel is approximately 3400 m^3/s (1.2×10^5 ft^3/s) with a maximum flow of about 8500 m^3/s (3.0×10^5 ft^3/s). This translates into current velocities of about 1.8 to 3.3 km/hr (1 to 1.8 knots), with slightly lower velocities near the plant. Weak currents predominate in both the Niantic River and Jordan Cove. Tidal fluctuation in this area is not severe, with mean and maximum ranges of 0.8 and 1.0 m (2.6 and 3.3 ft), respectively (Dominion 2004e).

EPA Region 1 identified Long Island Sound as "an estuary of national significance" and listed six problem areas of concern associated with water quality (EPA 2004c):

(1) Low dissolved oxygen (hypoxia)
(2) Toxic contamination
(3) Pathogen contamination
(4) Floatable debris
(5) Habitat degradation and loss, and living resource health associated with items 1 to 4
(6) Land use and development resulting in habitat loss and degradation of water quality

These environmental issues have resulted in a variety of long-term, integrated studies of Long Island Sound by both State and Federal agencies.

2.2.5.2 Chemical Contaminants Near Millstone

Specific chemical data associated with sediment, water, or biota near the Millstone study area were not available for review, but, in general, surficial sediment associated with the eastern portion of Long Island Sound exhibits lower levels of common contaminants (metals, polyaromatic hydrocarbons, polychlorinated biphenyls, pesticides) than western Long Island Sound. Recent U.S. Geological Survey data (Mecray et al. 2004) suggested that metal concentrations showed regional patterns of high concentrations in the western Sound, with relatively low concentrations associated with the eastern Sound in the vicinity of Millstone. Draft data provided by Battelle (1999) associated with surficial samples from the Thames River indicated that most metals were below NOAA effects-range-median (Long et al. 1998), and

organic constituents were at or near analytical detection limits with the exception of the polyaromatic hydrocarbon, perylene, which was detected at concentrations ranging from approximately 20 to 1200 micrograms per kilogram (μg/kg) (20 to 1200 parts per billion [ppb]) dry weight. It is suspected that the source of this compound is biogenic rather than anthropogenic.

A citizens' group conducted limited chemical and radiological monitoring of bottom sediments in the vicinity of Millstone and reported possible elevated levels of hydrazine and uranium in the bottom sediments of Jordon Cove (CTDEP 2002c). The chemical compound 1,1-dimethylhydrazine (UMDH) was reported as detected in two sediment samples at low levels. It was postulated that the UMDH might be due to hydrazine used at Millstone for corrosion control. CTDEP reviewed available information and concluded that the detections likely were false positives because of questionable quality of the analytical procedures, and it was unlikely that hydrazine could accumulate in bottom sediments because it degrades rapidly into water and nitrogen. In addition, the particular chemical form of hydrazine used at Millstone is different than UMDH. There are also industrial facilities in the area that commonly use hydrazine. CTDEP also concluded that the types and levels of uranium measured in sediments near Millstone reflected naturally occurring background levels (CTDEP 2003c). Neither concern was judged by CTDEP to be sufficiently credible to warrant further investigation.

2.2.5.3 Expected Changes or Modifications to Water Body Over Life of Plant

Dredging near cooling water intakes was required during plant construction in the 1970s and was permitted by the U.S. Army Corps of Engineers (USACE) under permit DACW33-71-C-0024 on February 6, 1970, for Unit 2, and under permit DACW33-75-C-0095 on June 10, 1975, for Unit 3. Dominion also informed USACE and the CTDEP on February 23, 1977, of its intent to maintain the existing 16.8-m (55-ft) wide quarry cut riprap and fish barrier structures associated with Units 1 and 2 and received permission from CTDEP to construct and maintain another 16.8-m (55-ft) wide quarry cut entering Jordan Cove on February 23, 1977, to support Unit 3 operation (Figure 2-3). If further maintenance dredging is required during the life of the plant, it is assumed Dominion would obtain the necessary permits from USACE and CTDEP.

Because the discharge of cooling water and other effluents associated with plant activities is permitted under the NPDES administered by the CTDEP, it is assumed future discharge during the life of the plant would be regulated under this system.

2.2.5.4 Important Fish and Shellfish Communities Near Millstone

A variety of commercially, recreationally, or environmentally important fish and shellfish live or spend a portion of their life cycle in the vicinity of Millstone and also commonly occur in Long

Island Sound. Many of these species live in the waters near Millstone, travel through the area during their seasonal migrations in and out of Long Island Sound, or pass close to the plant as they enter rivers adjacent to Millstone during their spawning seasons. Because of their proximity to Millstone, they may be susceptible to entrainment, impingement, or other lethal or sublethal effects associated with plant operations. To assess relative species abundance near Millstone operations, a variety of collection and enumeration methods have been employed, including subsampling cooling water discharge using plankton nets to determine ichthyoplankton (fish eggs and larvae) abundance, shore zone seines to capture small fish, and bottom trawls to capture larger, demersal fish (Dominion 2004e). In general, assessments of fish and shellfish have included sampling stations in direct proximity to the plant (e.g., within a radius of approximately 3.2 km [2 mi]). Sampling stations included locations near the Unit 2 and 3 cooling water discharge, in the Niantic River and Bay, and in Jordan Cove. Far-field reference sites were not included in the fish and shellfish monitoring programs, nor were sampling grids located at varying distances from the area of interest to identify environmental gradient effects. The exception to this were plume dynamic studies and assessments of intertidal ecosystems.

2.2.5.5 Population Trends Associated with Important Fish and Shellfish Species

The following is a summary of the general population trends associated with the species that are considered important commercially, recreationally, or ecologically.

- **American Lobster**

The American lobster (*Homarus americanus*, family Nephropidae) is common in western and eastern Long Island Sound, with a range extending from Canada to Cape Hatteras. Lobsters represent an important fishery in New England and the northern Atlantic coast of the U.S. Lobsters can live up to 70 years; 6-year old individuals weigh approximately 0.5 kilograms (kg) (1 pound [lb]). Populations of American lobster near Millstone have been estimated from field studies since 1978 based on lobster pot deployments in the vicinity of Millstone. Lobster populations in eastern Long Island Sound have shown significant fluctuations in abundance over the past two decades, and the recent collapse of the fishery in 2000 caused the U.S. Secretary of Commerce to declare a failure of the commercial lobster fishery in Long Island Sound in January 2001 (Dominion 2004e; Sea Grant 2004a). Since that time, the lobster fishery has attracted the attention of both State and Federal agencies, resulting in regional scientific symposia, Sea Grant research initiatives, and increased environmental sampling at both State and local levels (Sea Grant 2004a). At present, it is believed some of the decline observed in the fishery can be attributed to the combined effects of disease and parasitism, but it also appears that the controlling factors might be attributed to physiological and biological

stresses associated with the ecosystem change, including regional water temperature increases and the impacts of persistent environmental contaminants.

Populations associated with Millstone, expressed as the geometric mean catch-per-unit-effort, have been variable over the past two decades, but have not exhibited the significant population crash observed elsewhere in the fishery since 2002.

- **Winter Flounder**

The winter flounder (*Pseudopleuronectes americanus*, family Pleuronectidae) is the most common shoal water flounder occurring in southern New England. Adults are typically 30 to 38 cm (12 to 15 in.) and weigh between 0.5 and 0.9 kg (1 and 2 lbs). It is an important commercial and recreational resource in New England (Bigelow and Schroeder 1953; NOAA 1998). Winter flounder tend to return to their natal estuaries in the late fall and early winter to breed and gradually migrate offshore in the spring and summer months to avoid increasing water temperatures. Individual females can produce up to 2,500,000 eggs, but 500,000 eggs is an approximate average. Commercial harvest is generally accomplished with trawls. Winter flounder populations near Millstone and in Long Island Sound have shown an overall decrease over the past two decades (Figure 2-6).

The abundance of winter flounder peaked in the 1980s as a result of extraordinarily large year-classes produced during abnormally cold winters during the 1970s (Dominion 2004e). Comparison of abundance estimates from the Niantic River near Millstone with regional trends in Long Island Sound suggest similar regional decreases in abundance during concurrent reporting years (Figure 2-6) (Gottschall et al. 2003; NOAA 1998; MacLeod 2003; NOAA 2003b).

With regard to current winter flounder stock abundance, Northeast Fisheries Science Center (2003) stated that the Southern New England/Mid-Atlantic winter flounder stock complex, which includes Niantic River winter flounder, has been overfished and overfishing is continuing to occur. The current assessment provided a much more pessimistic evaluation of stock status than the previous assessment made in 1998. Recruitment to the Southern New England/Mid-Atlantic winter flounder stock has been below average since 1989, and indications are that the 2001 year-class is the smallest in 22 years.

A variety of environmental factors may be responsible for decreasing winter flounder abundances in the Niantic River. These factors include overfishing, entrainment of larvae by Millstone, increasing water temperatures in the region, increased predation, and habitat degradation associated with contaminant or nutrient inputs into the Niantic River estuary. Because winter flounder exhibit high fidelity to their natal stream, localized impacts to this

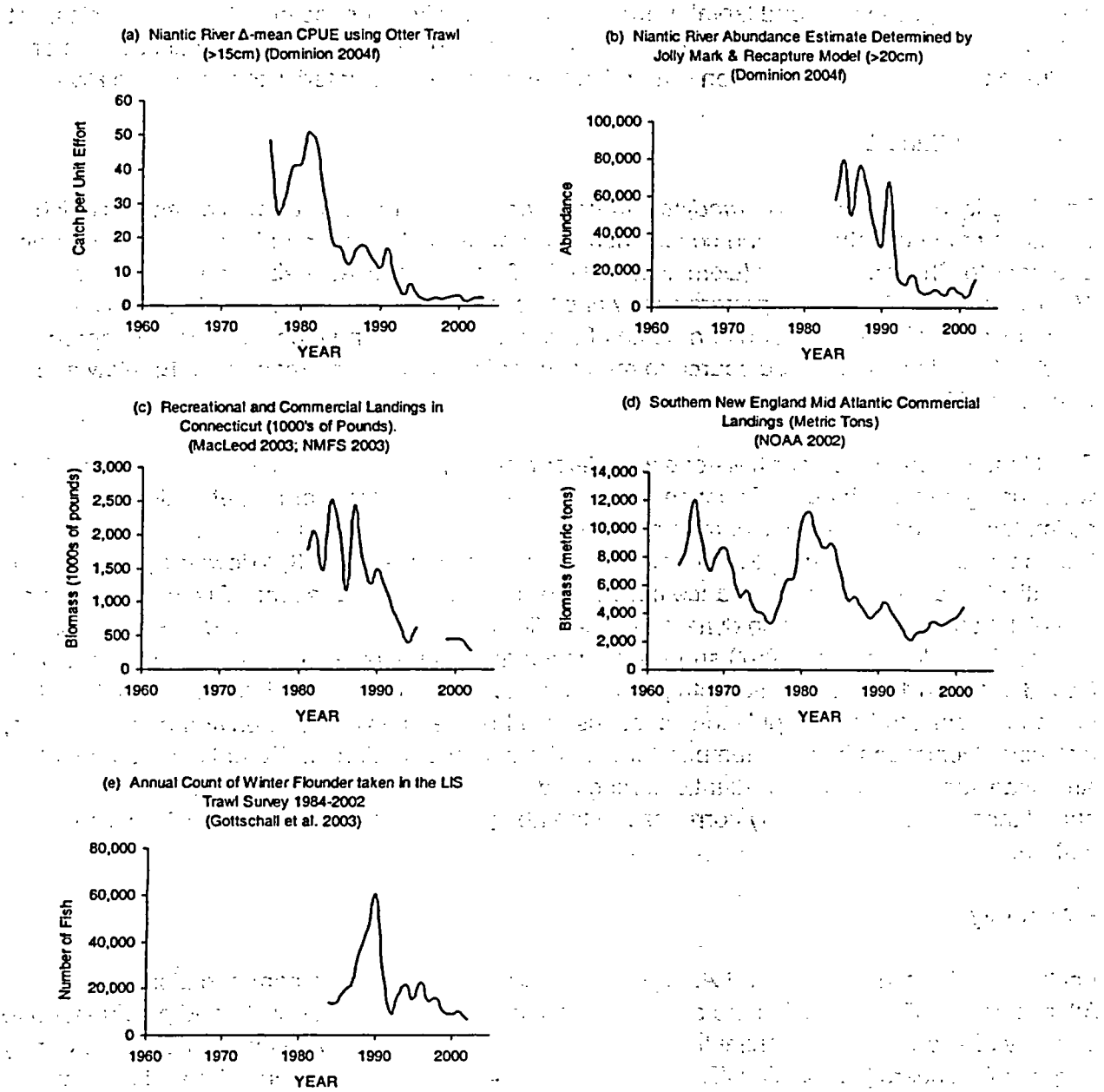

Figure 2-6. Comparison of Winter Flounder Population Trends in the Niantic River and the Region

species during spawning and larval growth can dramatically influence population dynamics. At present, it is not possible to quantify the importance of the various environmental stresses or evaluate their relative influence on winter flounder survival associated with the Niantic River.

- **American Sand Lance**

The American sand lance (*Ammodytes americanus*, family Ammodytidae) is a schooling fish that is common to estuaries and coastal nearshore waters. Its geographic range extends from Labrador to Chesapeake Bay (Dominion 2004e). This fish reaches a size of approximately 10 to 15 cm (4 to 6 in.), and prefers sandy habitats in shallow water and muddy bottoms in deeper water, where it burrows to a depth of several inches. Sand lance generally congregate in schools and provide a food source to many larger fish and marine mammals (Bigelow and Schroeder 1953).

Sand lance abundance near Millstone was determined by trawl, seine, and sampling of cooling water using fine-mesh nets. Because few fish were caught by trawl or net, abundance estimates are based on larval entrainment sampling of Millstone cooling water. The overall trends using this metric suggest a large population abundance in 1978, followed by a decline to a relatively stable but low abundance from approximately 1982 to present. Given the nature of fish distribution and population dynamics, it is difficult to assess regional trends. Population studies (Monteleone et al. 1987) suggest large variations in population densities in Long Island Sound between 1951 and 1983, with peak abundances occurring in the late 1970s as they did in the Millstone studies. Population variations may be due to a variety of environmental factors, including fluctuations in water temperatures and predator abundance. Potential predators of American sand lance include Atlantic herring and Atlantic mackerel. Regional sand lance abundance has been inversely correlated to the abundance of these predators (Dominion 2004e).

- **Anchovy**

Anchovies (*Anchoa mitchelli* and *A. hepsetus*, family Engaulidae) are common along the Atlantic coast. These species are an important component of the food web, and provide food to a variety of sport and commercial fishes (U.S. Fish and Wildlife Service and United States Army Corps of Engineers [FWS/USACE] 1989). The fish are generally silver in color and seldom exceed 8 cm (3 in.) in length. Although anchovies have historically been an important commercial fishery on the west coast, they are not considered an important commercial species in the mid-Atlantic region. They are, however, one of the most important species in the mid-Atlantic region as a primary forage item for many economically important predators and represent an important part of the regional food web (FWS/USACE 1989). Studies conducted by Morgan et al. (1995) suggest that bay anchovy (*A. mitchelli*) demonstrate little genetic

variation and no discernable stock structure, probably due to the enormous population size and movement and mixing of various stocks. Bay anchovy can spawn repeatedly during the summer, and evidence suggests that spawning is correlated with zooplankton abundance (Dominion 2004e).

Anchovy abundance in the vicinity of Millstone was estimated based on larval entrainment associated with plant cooling water (Dominion 2004e). Based on these evaluations, anchovy abundance reached its highest level in 1981, dropped dramatically between 1981 and 1982, and has gradually decreased since that time. Entrainment estimates at Millstone from 2000 to 2002 were the lowest levels recorded since the study was initiated. The data associated with the Dominion studies for this species exhibit a large variation in larval density, with large uncertainty associated with the abundance estimates (Dominion 2004e). Quantitative anchovy biomass data are not available for Long Island Sound or the Mid-Atlantic region, but a dramatic regional decline in the abundance of this species was noted in the Chesapeake Bay by Price (1999). Because actual abundance data associated with this reference are lacking, these data are considered to be a qualitative estimate of the status of the resource. Further evidence of regional anchovy decline is presented in Dominion (2004e) as a personal communication from Tim Lynch. Both qualitative assessments suggest the regional decline observed at Millstone is similar to regional trends.

- **Atlantic Menhaden**

The Atlantic menhaden (*Brevoortia tyrannus*, family Clupeidae) is a common inhabitant of coastal waters extending from Nova Scotia to southeastern Florida (Bigelow and Schroeder 1953). Adults average 30 to 38 cm (12 to 15 in.) in length and generally weigh 0.5 kg (1 lb) or less. Menhaden feed primarily on diatoms and small crustaceans, and they are an important part of the food web in the coastal system, serving as food for larger fishes. Menhaden exhibit a distinct annual cycle of movements that includes a southward movement in the fall and early winter, with overwintering observed in the Carolinas and southward. Spawning takes place at night and can occur during any month of the year. Most spawning takes place in the ocean where larval growth and development occur, but spawning has been reported to occur in Long Island Sound from late spring to early fall. Two distinct spawning periods, including a large event in summer and a smaller event in the fall, have been observed at Millstone (Dominion 2004e). Atlantic menhaden support the largest commercial fishery along the Atlantic coast. The species is primarily used for fish meal, oil, and emulsions (Dominion 2004e). The status of the fishery is considered to be healthy, with commercial harvests over the past seven years for the Atlantic seaboard ranging from approximately 259 $\times 10^3$ to over 300 $\times$ 10^3 metric tons (MT) (286 $\times$ 10^3 to 331 $\times$ 10^3 tons) (Beal et al. 1998).

Atlantic menhaden were collected sporadically by trawl or seine near Millstone over the past 20 years; thus reliable abundance estimates were not possible. Estimations of menhaden abundance based on larval entrainment suggest an overall increase in larvae from approximately 1987 to present, with the highest entrainment abundances recorded in 2002.

- **Silversides**

The silversides (*Menidia menidia* and *M. beryllina*, family Atherinidae) are small schooling fish common to bays, estuaries, and salt marshes of New England. Silversides are omnivorous, feeding primarily on copepods, juvenile mysids, small shrimp, amphipods, and the eggs of other fish. Silversides grow to a length of approximately 13 cm (5 in.). They are used as bait fish and are ecologically important as prey for larger fish, including bluefish (*Pomatomus saltatrix*), mackerel (*Scomber scombrus*), and striped bass (*Morone saxatilis*) (Bigelow and Schroeder 1953). Silversides mature during their first year of life and are believed to live only one or two years. Spawning occurs at water temperatures of 9 to 12 °C (48 to 54 °F) and generally occurs during the day at high tide on a semilunar cycle. Eggs are adhesive, and attach to available vegetation; larvae are planktonic and tend to remain in the spawning area (Dominion 2004e). Silverside abundance near Millstone was assessed by trawl and seine sampling. Abundances varied from year to year in the vicinity of the Millstone site without apparent long-term trend. Gottschall et al. (2003) observed similar fluctuations without trend throughout Long Island Sound.

- **Grubby**

Grubby (*Myoxocephalus aenaeus,* family Cottidae) is a demersal fish common to New England waters from the tide mark to a depth of approximately 30.5 m (100 ft). They are found on a variety of bottom types; they are most abundant among eelgrass. Grubby exhibit a high tolerance to both salinity and temperature changes (Bigelow and Schroeder 1953). Grubby feed primarily on annelid worms, shrimp, small crabs, and mollusks, and are of limited recreational and commercial value. Given the protective spines present on this species, it is unlikely that it represents an important prey item for higher-trophic-level predators. Grubby spawn throughout the winter and produce a demersal, adhesive egg that hatches in approximately 40 to 44 days (Dominion 2004e). Grubby populations at Millstone were assessed using trawls at three locations (Niantic River, Jordan Cove, and cooling water intake). Grubby populations have varied without apparent long-term trend in the vicinity of the Millstone site. Regional abundance data are not available.

- **Cunner**

The cunner (*Tautogolabrus adspersus*, family Labridae) is a coastal fish occurring from Newfoundland to Chesapeake Bay in shallow waters. Cunner are plentiful from just below the tideline downward, and often are associated with eelgrass, rocks, pilings, and mussel beds (Dominion 2004e). Cunner are omnivorous and feed exclusively within eelgrass, rock, piling, and mussel bed habitats. They have been known to feed on amphipods, shrimp, young lobsters and crabs, mollusks, hydroids, and polychaete worms (Bigelow and Schroeder 1953). Cunner tend to stay close to the bottom and are not known to school. Cunner are relatively small fish (15 to 25 cm [6 to 10 in.]) and currently have little recreational or commercial value. There is, however, a developing commercial interest in this species.

Cunner mature at approximately two years of age and spawn from late spring through early summer, and they produce buoyant, transparent eggs (Bigelow and Schroeder 1953). Dominion (2004e) cites evidence suggesting that settlement of metamorphosed larvae is not affected by habitat type or adult density, but that postsettlement survival, recruitment success, and subsequent adult densities were positively correlated with habitat complexity. Regional abundance data suggest that stocks have declined in Long Island Sound (Dominion 2004e). Abundance estimates using trawls have been conducted for 27 years near the Millstone intake and at Jordan Cove. Abundance of cunner eggs and larvae has varied considerably over the past two decades. Egg abundance has generally declined, but larval entrainment appears to vary without trend (Dominion 2004e). Trawl catch-per-unit-effort has fluctuated widely over the past two decades but has shown a general increase over the past three years (Dominion 2004e).

- **Tautog**

The tautog (*Tautoga onitis*, family Labridae) is common in the waters of New England, with a geographic range from New Brunswick to South Carolina. Tautog prefer rocky environments and are known to stay within a few miles of the coastline. Adults can reach a maximum length of about 1 m (3 ft), but are usually less than 0.6 m (2 ft) and weigh less than 4.5 kg (10 lb). When tautog are not feeding, they are known to gather in holes or clefts in rocks where they lie inert, on their sides, until tidal fluctuations initiate feeding behavior (Bigelow and Schroeder 1953). Tautog feed primarily on invertebrates, such as mollusks, mussels, and barnacles. Tautog are long-lived, with reported maximum ages for males and females of 34 and 27 years, respectively (Dominion 2004e). Tautog mature at 2 to 4 years of age, return to nearshore waters in spring prior to spawning, and appear to exhibit some spawning area site fidelity (Dominion 2004e).

Tautog abundance near Millstone was assessed through trawl surveys near the Millstone cooling water intakes in the Niantic River and at Jordan Cove. Abundances at these locations appeared to vary without trend, although increases appeared to be associated with sampling years 1999 to 2002. The recreational harvest for the state of Connecticut has varied considerably over time, with peak harvests of over one million fish occurring in 1987, 1989, and 1992 (Beal et al. 1998).

2.2.5.6 Other Important Aquatic Resources

Other important aquatic resources include eelgrass beds, rocky intertidal habitats, and benthic infaunal assemblages. These communities are an important component of the nearshore ecosystem associated with Millstone, and changes to these communities can directly affect the fish, shellfish, and bird communities they support.

- **Eelgrass**

Eelgrass (*Zostera marina*, family Potamogentomaceae) is one of the dominant seagrasses in coastal regions of the northern hemisphere and is found in eastern Long Island Sound near the Millstone facility. This seagrass is important because of its significant influence on nearshore environment. Eelgrass beds provide habitat and cover for many larval and juvenile forms of fish and invertebrates, support significant primary and secondary production, and serve as a food source for numerous waterfowl and planktonic grazers (Keser et al. 2003). Eelgrass beds in the vicinity of Millstone have been monitored for many years to evaluate population dynamics and to document population changes over time. Sampling locations included areas associated with thermal plume discharge (Jordan Cove, White Point) and reference locations associated with the Niantic River (Dominion 2004e). Studies near Millstone and in Long Island Sound have shown considerable variation in the extent of eelgrass beds at all locations, probably due to multiple environmental factors, including water body temperature fluctuations, eutrophication, sedimentation, turbidity, the presence of nuisance organisms (mussels and green algal blooms), and possible changes associated with nearshore hydrodynamics.

- **Rocky Intertidal Communities**

A rich and varied rocky intertidal habitat exists in the region surrounding Millstone, and includes marine algae, polychaeteous annelids, crustaceans, and molluscs. These organisms are important contributors to the structure and function of the nearshore ecosystem. Environmental studies conducted by Dominion have included sample collection sites at Fox Island, Millstone Point, White Point, and a reference location near Giant's Neck. Monitoring studies have included qualitative assessments of attached flora at each site, abundance estimates of rocky intertidal organisms, and growth and mortality studies on algal species of interest. Cooling

water discharge stations included a location close to the quarry cuts, and one location approximately 200 m (656 ft) southeast of the quarry cut. Millstone monitoring programs have been in effect since 1979 and are intended to provide (1) an environmental baseline of abundance of important species and (2) a means to detect change in community structure and function near the Millstone facility.

Algal studies have been conducted since 1979 and have identified over 140 species that occur or have occurred in the area during the study duration. Dominion scientists have focused on classes of organisms that represent the more common marine flora or fauna, including barnacles; the brown algae *Fucus* spp. and *Ascophyllum nodosum*; the red algae *Chondruscrispus* spp.; and the marine mussel *Mytilus edulis*.

- **Benthic Infauna**

Benthic infaunal communities near Millstone are consistent with soft bottom, nearshore environments associated with New England. These communities typically contain a diverse assemblage of species that collectively contribute to the stability of the nearshore food web. Subtidal communities in the vicinity of Millstone and at a reference site located near Giant's Neck have been sampled and studied since 1980. During the 2003 sampling, marine polychaetes were the most abundant taxa, followed by oligochaetes, arthropods, and molluscs (Dominion 2004e). The following infaunal taxa were selected as representative of sites affected by Millstone: oligochaetes; the polychaetes *Aricidea catherinae*, *Mediomastus ambiseta*, *Tharyx* spp., *Polycirrus eximius*, *Protodorvillea gaspeensis*, and *Parapionosyllis longicirrata;* and the bivalve mollusc *Nucula annulata* (Dominion 2004e). Monitoring studies have been helpful in detecting changes in benthic infauna community structure and in linking the observed changes to both natural and anthropogenic disturbances.

2.2.5.7 Threatened or Endangered Aquatic Species

Aquatic species that are Federally protected under the Endangered Species Act and listed by the FWS and/or NOAA Fisheries (also known as National Marine Fisheries Service [NMFS]) and that have the potential to occur in the vicinity of Millstone or along the transmission ROWs are presented in Table 2-2. Table 2-2 includes aquatic species listed by the state of Connecticut that are not listed Federally.

According to the Dominion Environmental Report (Dominion 2004a), endangered whale species pass south of Long Island during seasonal migrations and are occasionally observed in Long Island Sound. There have been no known observations of these species near the Millstone facility. Likewise, endangered or threatened sea turtle species have been observed in Long Island Sound and in the vicinity of Millstone; however, none have been impinged on the intake

screens and none have been collected during trawl studies. The endangered shortnose sturgeon (*Acipenser brevirostrum*), known from the Connecticut River, could enter Long Island Sound. None has been impinged on the intake screens and none has been collected during trawl studies. Life history information suggests that it is unlikely that shortnose sturgeon would be present in the vicinity of Millstone.

Table 2-2. Aquatic Species Listed as Endangered or Threatened by the State of Connecticut, the FWS, or NOAA Fisheries or that are Known to Occur or Potentially Occur Within Millstone Site or the Associated Transmission Line ROWs

Scientific Name	Common Name	Federal Status[a]	State Status[a,b]
	FISH		
Acipenser brevirostrum	shortnose sturgeon	Endangered	Endangered
Acipenser oxyrhinchus	Atlantic sturgeon		Threatened
	REPTILES		
Caretta caretta	loggerhead turtle	Endangered	Threatened
Chelonia mydas	green turtle	Threatened	Threatened
Dermochelys coriacea	leatherback turtle	Endangered	Endangered
Lepidochelys kempii	Kemp's ridley turtle	Endangered	Endangered
	MAMMALS		
Balaena glacialis	North Atlantic right whale	Endangered	Not listed
Balaenoptera physalus	finback whale	Endangered	Not listed
Megaptera novaengliae	humpback whale	Endangered	Not listed

(a) FWS 1999. Title 50, Wildlife and Fisheries, Part 17, Endangered and Threatened Wildlife and Plants, Subpart B Lists. U.S. Fish and Wildlife Service, December 21, 1999.
(b) CTDEP 2004 http://dep.state.ct.us/burnatr/wildlife/learn/esfact.htm (accessed April 27, 2004).

Shortnose Sturgeon (*Acipenser brevirostrum*)

The shortnose sturgeon is Federally listed as endangered throughout its range (FWS 2004). Two populations of shortnose sturgeon are present in the Connecticut River. One is landlocked in the upper part of the river between the Holyoke and Turners Dams in Massachusetts, and the other population is located in the lower Connecticut River between the Holyoke Dam and Long Island Sound. An estimated 1200 to 1500 shortnose sturgeon are found in freshwater and estuarine portions of the Connecticut River and are presumed to occasionally occur in adjacent areas of Long Island Sound (FWS 2001). No shortnose sturgeon have been impinged or captured in more than 30 years of sampling at Millstone (Dominion 2004a). The primary threats to this species are dam building, water pollution, and dredging (NatureServe 2004).

Atlantic Sturgeon (*Acipenser oxyrinchus*)

The Atlantic sturgeon is State-listed as threatened. Atlantic sturgeon are present in Long Island Sound, which may be an important feeding or resting area in transit to and from spawning areas (CTDEP 2004). Adult-sized sturgeon, up to 3.7 m [12 ft], are occasionally seen in the rivers of Connecticut. Declines in Atlantic sturgeon populations are the result of overfishing, loss of habitat, limited access to spawning areas, and water pollution (CTDEP 2004). The applicant reported that one Atlantic sturgeon specimen was captured and released alive during a trawl survey in 1980.

Loggerhead Turtle (*Caretta caretta)*

The loggerhead turtle is Federally listed as threatened throughout its range (FWS 2004). There are currently no critical habitats designated for this species, although NOAA Fisheries is currently working on a status review based on a 2002 petition to reclassify the Northern and Florida Panhandle subpopulations with endangered status and to designate critical habitat for both subpopulations (NOAA 2004a). The range for the Atlantic population of loggerheads extends from Newfoundland to Argentina, with primary nesting areas located in Florida, Georgia, and the Carolinas.

Green Turtle (*Chelonia mydas*)

The green turtle is Federally listed as endangered in the breeding colony populations in Florida and on the Pacific coast of Mexico and threatened for all other populations (FWS 2004). The western Atlantic population of green turtles ranges from Massachusetts south to the U.S. Virgin Islands and Puerto Rico, with important feeding grounds in Florida and primary nesting sites on the east coast of Florida, the U.S. Virgin Islands, and Puerto Rico (NOAA 2004b). There is critical habitat designated in Puerto Rico.

Leatherback Turtle (*Dermochelys coriacea*)

The leatherback turtle is Federally listed as endangered throughout its range (FWS 2004). The western Atlantic population of leatherback turtles ranges from Nova Scotia to Puerto Rico and the U.S. Virgin Islands. During the summer, leatherback turtles are typically found along the east coast of the U.S. from the Gulf of Maine to central Florida. Critical habitat designated in the area around the U.S. Virgin Islands, with nesting sites located from Georgia to the U.S. Virgin Islands (NOAA 2004c). The primary threats to the survival of leatherback turtles include habitat destruction, incidental catch in commercial fisheries, and harvest of eggs and mea (NOAA 2004c).

Kemp's Ridley Turtle (*Lepidochelys kempii*)

The Kemp's ridley turtle is Federally listed as endangered throughout its range (FWS 2004). This species is found primarily in coastal areas of the Gulf of Mexico and the northwestern Atlantic, with a major nesting beach on the northeastern coast of Mexico (NOAA 2004d). Habitat degradation, pollution, and ingestion of floating debris are among the most significant threats to Kemp's ridley (NOAA 2004d). No critical habitat has been designated for this species.

North Atlantic Right Whale (*Eubalaena glacialis*)

The North Atlantic right whale is Federally listed as endangered throughout its range (FWS 2004). With a population estimated at 291 individuals in 1998, the North Atlantic right whale is considered to be one of the most critically endangered populations of large whales in the world (NOAA 2002). According to NOAA Fisheries (2002), this population ranges from wintering and calving grounds in the coastal waters of the southeastern United States to summer feeding and breeding grounds in New England waters and northward. In 1994, NOAA Fisheries designated three critical habitats for the North Atlantic right whale: Cape Cod Bay/Massachusetts Bay, Great South Channel, and the Southeastern USA. At the present time, injuries and mortality caused by ship strikes are the primary source of human impacts to North Atlantic right whales, with some additional impacts from fishery entanglements. North Atlantic right whales have been sighted near Long Island Sound (NOAA 2002), but are not known to move into the shallow waters immediately offshore of the Millstone site (Dominion 2004e).

Finback Whale (*Balaenoptera physalus*)

The finback (fin) whale is Federally listed as endangered throughout its range (FWS 2004). According to NOAA Fisheries (2002), the current minimum population estimate from a 1999 survey for the western North Atlantic fin whale was 2362. Fin whales are found principally in waters from North Carolina north to Nova Scotia. New England waters provide an important feeding ground for this species. There are no critical habitats designated for the fin whale, although a recovery plan has been drafted. At the present time, injuries and mortality caused by ship strikes are the primary source of human impacts to fin whales. It is possible that fin whales could enter Long Island Sound, but they are not known to move into the shallow waters immediately offshore of the Millstone site (Dominion 2004e).

Humpback Whale (*Megaptera novaengliae*)

The humpback whale is Federally listed as endangered throughout its range (FWS 2004). According to NOAA Fisheries (2002), the overall abundance for the Gulf of Maine humpback whale stock was estimated in 1992/1993 at 11,570 individuals. Gulf of Maine humpback whales are found during the spring, summer, and fall over a range covering the eastern coast of the United States. New England waters are an important feeding ground for this species. A recovery plan for humpback whales is in effect. Injuries and mortality from fishery entanglements and ship strikes are the primary human impacts on humpback whales. Disturbance from whale watching traffic is also of concern, particularly in coastal New England waters. It is possible that humpback whales could enter Long Island Sound, but they are not known to move into the shallow waters immediately offshore of the Millstone site (Dominion 2004e). No critical habitat has been designated for this species.

2.2.6 Terrestrial Resources

The Millstone site supports flora and fauna common to the region. The Millstone site is located in the southern New England Coastal Plains and Hills of the Northeastern Coastal Zone ecoregion (EPA 2004). Presettlement vegetation would have consisted primarily of winter deciduous hardwood forests with some salt marsh and beach habitat types. Out of the approximately 212 ha (525 ac) that comprise the Millstone site, current land use includes approximately 89 ha (220 ac) of developed land, a 20-ha (50-ac) natural area, and a 12-ha (30-ac) ballpark licensed to the town of Waterford. Until 1960, the site was used as a granite quarry, in operation for some 200 years (Dominion 2004a).

2.2.6.1 Site Terrestrial Resources

The current terrestrial environment includes old field habitats dominated by eastern red cedar (*Juniperus virginiana*), scarlet oak (*Quercus coccinea*), black cherry (*Prunus serotina*), and blackberry (*Rubus* spp.) (Dominion 2004a). Common invasive exotics in this habitat include multiflora rose (*Rosa multiflora*) and Japanese honeysuckle (*Lonicera japonica*). Winter deciduous hardwood forest is the most common undisturbed habitat type and is dominated by various species of oak (*Quercus* spp.), pignut hickory (*Carya glabra*), black birch (*Betula lenta*), red maple (*Acer rubrum*), and American beech (*Fagus grandifolia*). Along the coast, beach and coastal marsh habitats are dominated by beach grass (*Ammopila breviligulata*), toadflax (*Linaria vulgaris*), evening primrose (*Oenothera biennis*), seaside goldenrod (*Solidago sempervirens*), salt meadow grass (*Spartina patens*), salt grass (*Distichlis spicata*), Bigelow's glasswort (*Salicornia bigelovii*), and smooth cordgrass (*Spartina alterniflora*). Ponds and wetlands in the eastern portion of the site are managed as a wildlife refuge.

Terrestrial habitats on the Millstone site support common wildlife species such as white-tailed deer (*Odocoileus virginianus*), gray squirrel (*Sciurus carolinensis*), cottontail rabbit (*Sylvilagus floridanus*), red fox (*Vulpes vulpes*), woodchuck (*Marmota monax*), and wild turkey (*Meleagris gallopavo*). Coastal marshes and the wildlife refuge on the site contain habitat that supports waterfowl such as mallard ducks (*Anas platyrhynchos*), wood ducks (*Aix sponsa*), Canada geese (*Branta canadensis*), common mergansers (*Mergus merganser*), black ducks (*Anas rubripes*), and multiple species of herons and egrets. Osprey (*Pandion haliaetus*) nest platforms have been maintained at Millstone for over 35 years, and 186 fledglings have been produced over this period (Dominion 2004a).

2.2.6.2 Threatened and Endangered Terrestrial Species

There are 16 species listed by FWS or the state of Connecticut that have either been observed on the site or have the potential to occur in the area or along transmission lines. An additional 342 State-listed species are reported to occur in counties traversed by transmission line ROWs. Table 2-3 shows terrestrial species that are listed by the FWS or the state of Connecticut and are known to have the potential to occur in the vicinity of the Millstone site or along the transmission ROWs. Additional State-listed species that have the potential to occur in Hartford, Middlesex, New London, or Tolland counties are listed in Appendix G.

Puritan Tiger Beetle (*Cicindela puritana*)

The Puritan tiger beetle (*Cicindela puritana*) is known from two disjunct populations, one along Chesapeake Bay in Maryland and one along the Connecticut River in northern Connecticut (CTDEP 2004c). Although this species is reported to occur in Middlesex County (FWS 2004), CTDEP maps clearly show the Connecticut population to be primarily along the Connecticut River in Hartford County (CTDEP 2004c). The Millstone ROW for the Manchester transmission line does not cross the Connecticut River in Hartford County. The Puritan tiger beetle is restricted to sandy habitats typically found along river banks. Habitat has been depleted through riverbank stabilization and flood control practices. There is no known habitat for this species near the Millstone site or associated transmission line ROWs. The Puritan tiger beetle is listed as threatened by the FWS and endangered by the state of Connecticut.

Sharp-shinned Hawk (*Accipiter striatus*)

The sharp-shinned hawk is a small accipiter found primarily in forested habitats. The sharp-shinned hawk is a relatively common fall migrant but has been listed as endangered because there is only a small breeding population in northern Connecticut (CTDEP 2004c). Population reduction is primarily a result of habitat degradation and past pesticide use. The sharp-shinned hawk is listed as endangered by the state of Connecticut.

Table 2-3. Terrestrial Species Listed as Endangered or Threatened by the State of Connecticut or the FWS and Proposed for Candidacy or that are Known to Occur or Potentially Occur Within Millstone Site or the Associated Transmission Line ROWs

Scientific Name	Common Name	Federal Status[a]	State Status[a,b]
	INSECTS		
Cicindela puritana	Puritan tiger beetle	Threatened	Endangered
	BIRDS		
Accipiter striatus	sharp-shinned hawk		Endangered
Ardea alba	great egret		Threatened
Charadrius melodus	piping plover	Threatened	Threatened
Circus cyaneus	northern harrier		Endangered
Egretta thula	snowy egret		Threatened
Falco peregrinus	peregrine falcon		Endangered
Haliaeetus leucocephalus	bald eagle	Threatened	Endangered
Icteria virens	yellow-breasted chat		Endangered
Pooecetes gramineus	vesper sparrow		Endangered
Podilymbus podiceps	pied-billed grebe		Endangered
Sterna antillarum	least tern		Threatened
Sterna dougallii	roseate tern	Endangered	Endangered
	MAMMALS		
Sylvilagus transitionalis	New England cottontail rabbit	Candidate	
	PLANTS		
Isotria medeoloides	small whorled pogonia	Threatened	Endangered
Scleria triglomerata	tall nut sedge		Endangered

(a) FWS 1999. Title 50, Wildlife and Fisheries, Part 17, Endangered and Threatened Wildlife and Plants, Subpart B Lists. U.S. Fish and Wildlife Service, December 21, 1999.
(b) CTDEP 2004c http://dep.state.ct.us/burnatr/wildlife/learn/esfact.htm (accessed April 27, 2004).

Great Egret (*Ardea albus*)

The great egret is a large white heron that can be found in a variety of fresh and saltwater habitats. Great egrets were very rare in Connecticut by the mid 1800s, primarily due to market hunting for their aigrettes (plumes), used in women's apparel (CTDEP 2004c). Coastal

development and disturbance of nesting colonies have hampered their recovery. The great egret is listed as threatened by the state of Connecticut.

Piping Plover (*Charadrius melodus*)

The piping plover is a shorebird that is found nesting in sandy beach habitats along seacoasts (CTDEP 2004c). Piping plovers nest from North Carolina north to Nova Scotia. Nesting generally occurs from March through July. Historically, these birds were killed for consumption, and the feathers used for adornment. Current threats include beach stabilization and development. The piping plover is listed as threatened by the FWS and the state of Connecticut. There have been no reported sightings of piping plover at the Millstone site. It is not likely that the necessary beach habitat for nesting is present in the vicinity of the site.

Northern Harrier (*Circus cyaneus*)

The northern harrier, or marsh hawk, is a relatively large bird of prey that prefers open marshland and meadows. Once recorded as common in Connecticut, it is now listed as endangered by the state of Connecticut. The population has been reduced by habitat degradation and past use of DDT (CTDEP 2004c). Northern harriers have been recorded at the Millstone site as an occasional migrant (Dominion 2004a).

Snowy Egret (*Egretta thula*)

The snowy egret is a medium-sized white heron that is found in habitats similar to the habitats where the larger great egret is found. Because of their showy plumes, snowy egrets were hunted even more extensively than the great egret, and the species was virtually extirpated from Connecticut by the late 1800s (CTDEP 2004c). Snowy egrets have been nesting in the State since 1961, but breeding populations remain low. The snowy egret is listed as threatened by the state of Connecticut.

Peregrine Falcon (*Falco peregrinus*)

The peregrine falcon has widespread distribution in open country from coastal areas to the mountains. Nesting peregrine falcons were relatively common in Connecticut though the early 1900s before egg collecting and later pesticide contamination nearly extirpated the species (CTDEP 2004c). The peregrine falcon is listed as endangered by the state of Connecticut.

Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle is a large raptor that is found along the coastline and around lakes and rivers. There are reported to be up to 100 bald eagles wintering along major rivers and reservoirs in Connecticut (CTDEP 2004c). There are no known nesting pairs of bald eagles near the Millstone site or along the transmission line ROWs. Individual bald eagles have been seen foraging in the area. Bald eagle populations have declined in the State due to loss of habitat, human disturbance, and pesticide contamination. The bald eagle is listed as threatened by the FWS and as endangered by the state of Connecticut.

Yellow-breasted Chat (*Icteria virens*)

The yellow-breasted chat is a songbird found in mid-successional shrubby habitats such as woodland edges, briar thickets, and old fields. Although once considered common in Connecticut, populations have declined due to the loss of farmlands and pastures (CTDEP 2004c). A few individuals were sighted in the Waterford area from 1986 to 1988 (CTDEP 2002b). The yellow-breasted chat is listed as endangered by the state of Connecticut.

Pied-billed Grebe (*Podilymbus podiceps*)

The pied-billed grebe is a small diving bird that is found in fresh and saltwater habitats. The species is declining throughout New England because of historically low numbers and wetland habitat loss. It has apparently never been common in Connecticut and has been recorded breeding in only two isolated locations in the State (CTDEP 2004c). It has been recorded at the Millstone site as an occasional migrant (Dominion 2004a). The pied-billed grebe is listed as endangered by the state of Connecticut.

Vesper Sparrow (*Pooecetes gramineus*)

The vesper sparrow is a songbird found in open areas such as old fields, meadows, agricultural areas, and, occasionally, beach habitats. Apparently common in the mid 1800s, numbers have dropped in the past century with the decline in agriculture and increase in residential and commercial development (CTDEP 2004c). The vesper sparrow has not been confirmed nesting in the state of Connecticut since 1984 and is listed as endangered by the state of Connecticut.

Least Tern (*Sterna antillarum*)

The least tern is a seabird that nests on beaches along coastlines, offshore islands, and large rivers. Similar to the roseate tern, least tern populations in Connecticut were decimated by market hunting by the early 1900s and continue to be impacted by shoreline development and

predators that are often associated with human development (CTDEP 2004c). The least tern is listed as threatened by the state of Connecticut.

Roseate Tern (*Sterna dougallii*)

The roseate tern is a seabird that is found almost exclusively on saltwater coastlines. Roseate terns nest in colonies on coastal beaches and offshore islands. Historically, tern populations in Connecticut have been impacted by unrestricted market hunting and more recently by the expansion of predatory great black-backed and herring gull populations throughout their range in the State (CTDEP 2004c). Roseate terns are listed as endangered by both the FWS and the state of Connecticut. Fox Island, a small promontory extending off Millstone Point into Long Island Sound, is known to be used by roseate terns during the fall migration period. Roseate terns are not known to nest in the vicinity of the Millstone site (Dominion 2004a).

New England Cottontail Rabbit (*Sylvilagus transitionalis*)

The New England cottontail rabbit is found in brushy habitats associated with edges of fields and forests, fence lines, and, probably, transmission line ROWs. Populations in Connecticut were considered abundant through the mid 1930s, but competition from introduced Eastern cottontail rabbits (*Sylvilagus floridanus*) and loss of agriculture-related habitat has led to the New England cottontail rabbit's status as a proposed candidate for Federal listing. Vegetation management techniques used on the Millstone site and associated transmission line ROWs maintain early successional habitat types the New England cottontail requires.

Small Whorled Pogonia (*Isotria medeoloides*)

The small whorled pogonia occurs in isolated populations throughout the eastern United States. In Connecticut, it is reported to occur in New London, Middlesex, Tolland, Hartford, and New Haven counties. New England populations of this orchid are found almost exclusively on acidic, well-drained fragipan (a subsurface impermiable layer) soils (NatureServe 2004). Common plant associates include red maple, eastern hemlock (*Tsuga canadensis*), paper birch (*Betula papyrifera*), northern red oak (*Quercus rubra*), eastern white pine (*Pinus strobus*), and American beech. Small whorled pogonia populations are found in second growth and mature forests. The major threats to this species are habitat destruction through development and logging. The small whorled pogonia is listed as threatened by the FWS and endangered by the state of Connecticut. Habitat for the small whorled pogonia may exist at the Millstone site or along associated transmission line ROWs.

Tall Nut Sedge (*Scleria triglomerata)*

The tall nut sedge or nut rush is a grass-like plant that favors wet habitats. A population of tall nut sedge has been found on the shared Card Street/Manchester transmission line ROW approximately 3.2 km (2 miles) north of the Hunts Brook Junction (Dominion 2004a; CTDEP 2002b). This species is listed as endangered by the state of Connecticut.

2.2.7 Radiological Impacts

Millstone conducts an annual Radiological Environmental Monitoring Program (REMP) in and around the Millstone site and publishes an *Annual Radiological Environmental Operating Report* (Dominion 2002a; Dominion 2003a; Dominion 2004b). Through this program, radiological impacts to employees, the public, and the environment are monitored, documented, and compared to the appropriate standards. The objectives of the REMP are the following:

- provide representative measurements of radiation levels and radioactive materials in the exposure pathways and of the radionuclides that have the highest potential for radiation exposures to members of the public; and
- supplement the radiological effluent monitoring program by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of effluent measurements and the modeling of the environmental exposure pathways.

Radiological releases are summarized in two Millstone reports: *Annual Radiological Environmental Operating Report* (Dominion 2003a) and *Radioactive Effluent Release Report* (Dominion 2003b). The limits for all radiological releases are specified in the Millstone REMODCM (Dominion 2005), and these limits are used to meet Federal standards and requirements. The REMP includes monitoring of the aquatic environment (fish, invertebrates, and shoreline sediment); atmospheric environment (airborne radioiodine, gross beta, and gamma); terrestrial environment (vegetation); and direct radiation. The *Annual Radiological Environmental Operating Report* found that:

No station effects were detected in terrestrial media. The predominant radioactivity, except for a few aquatic sample results, was that from outside sources, such as fallout from nuclear weapons tests and naturally occurring radionuclides. Monitoring of the aquatic environment in the area of the discharges indicated that presence of the following station related radionuclides: cobalt-60, cesium-137, silver-110m and tritium. Due to the decreasing trend in liquid effluent releases, a corresponding decrease is

observed in measured levels of radionuclides in the environment. Doses from the 2003 measured levels are well below those required by each unit's safety technical specifications. (Dominion 2004b).

Comparisons of zinc-65 and silver-110m discharges to uptakes in oysters in the quarry (on Dominion property) show a dependency between activity discharged and bioaccumulation in the oysters, as follows:

> The decreasing trend in effluent radioactive releases is apparent in both the curies released and the measured concentrations in oysters. (Dominion 2004b).

No measured radionuclides were observed in oysters beyond the station discharge area (outside the quarry).

Millstone's review of historical data on releases and the resultant dose calculations revealed that the calculated doses to maximally exposed individuals in the vicinity of Millstone were a small fraction of the limits specified in the Millstone REMODCM (Dominion 2005) to meet 10 CFR Part 50, Appendix I and EPA radiation standards in 40 CFR Part 190. For 2002, dose estimates were calculated based on actual liquid and gaseous effluent release data and conservative models to simulate the transport mechanisms. The results are described in the *Radioactive Effluent Release Reports* (Dominion 2003b). A second dose assessment method uses the actual measurements of the concentrations in various environmental media and dose consequences from the consumption of these foods (e.g., fish, shellfish), which are reported annually (Dominion 2003a). Dose estimates were performed by Millstone using the plant effluent release data, onsite meteorological data, and appropriate pathways identified in the REMODCM. An assessment of doses to the maximally exposed individual from gaseous and liquid effluents was performed by Millstone for locations representing the maximum dose. In all cases, doses were well below the limits as defined in the REMODCM (Dominion 2005). A breakdown of the calculated maximum dose to an individual located at the Millstone boundary from liquid and gaseous effluents released during 2002 is summarized as follows (Dominion 2003b):

- The critical organ dose due to the liquid effluents at the site discharge was 1.48×10^{-4} millisievert (mSv) (1.48×10^{-2} millirem [mrem]). This dose was about 0.15 percent of the 0.10 mSv (10 mrem) dose limit.

- The air dose due to noble gases in gaseous effluents was 1.89×10^{-4} milligray (mGy) (1.89×10^{-2} millirad [mrad]) or 0.189 percent of the 0.10 mGy (10 mrad) gamma dose limit and 6.91×10^{-4} mGy (6.91×10^{-2} mrad) beta or 0.346 percent of the 0.20 mGy (20 mrad) beta dose limit.

- The critical organ dose from gaseous effluents due to iodine-131, iodine-133, tritium, and particulates with half-lives greater than eight days was 2.99×10^{-4} mSv (2.99×10^{-2} mrem), which is 0.20 percent of the 0.15 mSv (15 mrem) dose limit.

The applicant does not anticipate any significant changes to the radioactive effluent releases or exposures from Millstone operations during the renewal period and, therefore, the impacts to the environment are not expected to change.

2.2.8 Socioeconomic Factors

The staff reviewed the Environmental Report (Dominion 2004a) and information obtained from meetings with local and regional agencies during a site visit to Waterford and the surrounding area from May 17 to 20, 2004. The following information describes the housing, public services, land use, demographics, and economy of the communities near Millstone.

2.2.8.1 Housing

Dominion employs a total nuclear-related permanent workforce of approximately 1550 to 1650 at Millstone. Of these, 1300 are Dominion employees and another 250 to 350 are long-term contractors. Approximately 73 percent of Millstone's employees live in New London County with about 140 employees living in Waterford, while another 200 live in Niantic and East Lyme. Another 12 percent reside in Middlesex County, and about 14 percent are distributed across 14 other counties in Connecticut, Massachusetts, and Rhode Island with numbers ranging from 1 to 60 employees per county. Less than 1 percent of the workforce resides outside of these three states. Table 2-4 summarizes the information for the permanent workforce. Given the predominance of regular employees living in New London and Middlesex counties, and the absence of the likelihood of significant socioeconomic impacts in other counties, the focus of this analysis is the town of Waterford and 20 other municipalities in New London County that form an area that is generally referred to as the Southeastern Connecticut Planning Region.

The Millstone reactors are on an 18-month refueling cycle. During refueling outages, site employment increases substantially above the 1550 to 1650 Dominion workforce by as many as 700 to 800 workers for a period of 28 to 30 days. Most of these temporary workers are assumed to live in the same geographic areas as the permanent Millstone staff. These numbers are within the GEIS range of 200 to 900 additional contractor workers per reactor outage.

Table 2-5 provides the number of housing units and housing unit vacancies for New London and Middlesex counties for 1990 and 2000, derived from U.S. Census Bureau information.

Table 2-4. Millstone Employee Residence Information by County

County	Number of Personnel	Percent of Total
New London	1205	73
Middlesex	198	12
Other Counties	231	14
Outside of CT, RI, and MA	16	1
TOTAL	**1650**	**100**

Source: Dominion 2004a

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

	1990	2000	Approximate Percentage Change
		NEW LONDON COUNTY	
Housing Units	104,461	110,674	5.9
Occupied Units	93,245	99,835	7.1
Vacant Units	11,216	10,839	(3.4)
		MIDDLESEX COUNTY	
Housing Units	61,593	67,285	9.2
Occupied Units	54,651	61,341	12.2
Vacant Units	6942	5944	(14.4)

Source: USCB 1990, 2000

New London County housing units numbered 110,674 and Middlesex County housing units numbered 67,285 in 2000. There were 10,839 vacant housing units in New London County and 5944 units in Middlesex County in 2000, corresponding to a rate of 9.8 percent and 8.8 percent, respectively. There were a total of 444 vacant housing units in Waterford in 2000, which equates to a vacancy rate of 5.6 percent. Approximately half of these vacancies are seasonal homes. The vacancy rate in Connecticut in 2000 was 6.1 percent. Two-thirds of the housing units in New London and Middlesex counties are owner occupied compared to nearly 95 percent of the housing units in Waterford (USCB 2000).

Housing has become more of a regional concern in southeastern Connecticut since 2000. Several interacting factors impact housing demand, supply, and affordability. There have been

fundamental shifts from a defense dependent economy to one dominated by gaming and tourism. There has been a reduction in the collective earning power of the employed labor force with the shift from manufacturing to service jobs and, consequently, there has been an increasing demand for affordable housing. The average median sales price for single-family homes within southeastern Connecticut increased by more than 50 percent between 2000 and 2003, and by 40 percent for condominiums. While the net increase in southeastern Connecticut population between 1990 and 2000 was just 1 percent, the population also grew older, households became smaller, single-family homes dominated housing starts, and vacancy rates declined. These housing issues are being addressed through cooperative efforts of the municipalities, tribal nations, the state of Connecticut, private nonprofits, major employers, and the housing industry (Southeastern Connecticut Council of Governments. [SCCOG] 2002).

According to Waterford's 1998 *Plan of Preservation, Conservation, and Development*, there is the theoretical potential for about 4000 additional housing units. The town had 7986 housing units in 2000 (USCB 2000) and could have 12,000 housing units when fully developed under existing zoning (Waterford 1998). The plan notes that Waterford is a suburban community consisting primarily of owner-occupied single-family dwellings on lots that range from 7500 ft^2 to 200,000 ft^2. Multiple-family dwellings are permitted with densities up to nine units per acre. The plan recommends that Waterford continue to provide for a diversity of housing types and encourage the availability of housing for a variety of age and income groups. The plan promotes modifying some residential zoning designations and regulations to accomplish these goals, while protecting natural resources and retaining the rural character cherished by residents. The pattern and pace of growth in Waterford is determined by the availability and location of suitable urban infrastructure. There are no current proposals to institute a moratorium on development in Waterford.

2.2.8.2 Public Services

Public services include water supply, education, and transportation.

- **Water Supply**

Table 2-6 displays public water supply information for the entire county of New London. Most of the Millstone employees reside in New London County, and this discussion of public water supply systems will focus on the three municipalities in New London County where the greatest number of employees live—Waterford, East Lyme / Niantic, and Colchester—and the city of New London, which supplies water to Waterford and provides potable water to Millstone. The city of New London obtains water from the Lake Konomoc reservoir located in Waterford and Montville. Millstone's 2000 to 2001 potable water usage averaged 125.7×10^4 L per day

(332.0 x 10^3 gpd). This usage represents approximately 5.2 percent of the city of New London's daily capacity and 6 percent of the city's average daily use.

State standards conclude that an adequate margin of safety exists when the safe yield is more than 125 percent of the average consumption, or average consumption is less than 80 percent of the safe yield. The Waterford water supply system may need to be expanded in the future because State standards indicate that there may not be an adequate margin of safety between average water consumption and the safe yield of the system. As a result, the city of New London is currently searching for additional supply sources for future consumption. An intermunicipal agreement with the city of New London provides that new Waterford customers may be denied service in times of water shortage (Waterford 1998).

Table 2-6. Major New London County Public Water Supplies and Capacities

Water Supplier	Water Source	Average Daily Use (MGD)[a]	Maximum Capacity (MGD)
Groton Water Department	surface water	9.31	12.6
Norwich Water Department	surface water	5.2	7.16
New London Water Division	surface water	5.5	6.4
East Lyme Water and Sewer Commission	groundwater	1.46	1.66
Waterford Water Pollution Control Authority	purchases water from New London Water Division	N/A	N/A
CT - American Water Co.—Mystic Valley Division	surface water and groundwater	1.56	1.5
Colchester Sewer and Water Commission	groundwater	0.48	0.74

Source: Dominion 2004a
(a) MGD—million gallons per day

A new water supply line was constructed in 2000 to supply a concession stand at the ball fields licensed by Millstone to Waterford. The stand had been supplied by a shallow low-yield well, which continues to be used to irrigate the ball fields on a seasonal basis.

Water availability may also be a more limiting factor for future growth in other New London County communities such as East Lyme and Colchester where Millstone workers prefer to reside. Aquifers provide the total current drinking water supply for East Lyme and will continue to do so for the foreseeable future. Although the town has the potential for developing new wells, the water supply is limited. Approximately 60 percent of the town is served by public water through the operation of seven wells located in four stratified drift aquifers. The

remaining 40 percent is served by private wells in bedrock aquifers. In 1998, the town implemented a moratorium on new water connections for subdivisions and commercial establishments. Peak daily demands are currently being met. However, estimated future demand may compel the town to seek other sources of water, and water conservation is strongly encouraged (Dominion 2004a).

The recently approved Thames Basin Regional Water Interconnection Project will provide alternative water supply sources for Waterford by interconnecting the Norwich, Groton, and the New London/Waterford systems. This project provides a degree of redundancy to the Waterford water system while mitigating pressure deficiencies that have been a concern for fire fighting in the Quaker Hill neighborhood. Piping water from Groton will provide a less costly solution than developing new sources while increasing the safe yield available for present and future demands (Waterford 2002).

The Colchester Sewer and Water Commission and the Public Works Department manage the public water system in Colchester. Public water is derived exclusively from public wells and service is essentially limited to the center of Colchester where the majority of the commercial and community facilities in town are located. The commission serves a population of approximately 4500. Colchester has adequate water supply sources to meet current demand. However, future water consumption is expected to increase and an eventual need for additional water supplies is projected. Several alternatives including additional ground-water options and/or an interconnection with the Norwich Water Department (which accesses the Deep River Reservoir in Colchester) are being explored. Presently, water conservation is encouraged (Dominion 2004a).

- **Education**

In 2000, 85.7 percent of the population of the southeastern Connecticut region who were 25 years or older had completed high school, while 25.3 percent were college graduates as compared to 31.4 percent for the State as a whole. In Waterford, in 2000, 86.8 percent of the population over 18 had completed high school, and 28.1 percent had finished college. All municipalities in the region recorded improvements in educational levels compared to previous years. Elementary and high school enrollments have experienced an increase since 1990, while preschool and college enrollments have decreased uniformly throughout the region. One plausible explanation for this situation is a pattern of in-migration by families with children in this age bracket (SCCOG 2003b).

The Waterford Public Schools project a budget of $34,398,900 for the 2004 / 2005 school year to operate five elementary, one middle, and one high school. Previous approved budgets for the town of Waterford show that funding for the Waterford Public Schools increased from $27,866,712 for 1997 to 1998 to $31,172,355 for 2001 to 2002. This increase reflects a

change from 48.9 percent of the total general fund to 52.2 percent following deregulation of Millstone. The Board of Education budget is projected to increase to $41,222,367 in 2013 representing 57.3 percent of the total budget for Waterford. Total enrollment in February 2004 was 3109 students of which 1361 were in elementary school, 776 in middle school, and 972 in high school. The total capacity of all the schools combined is 3324. Two of the elementary schools are now slightly exceeding their capacity, but portable classrooms are used in all the elementary schools to address this situation. There has been an increase in overall enrollment during the past five years from 2981 students in 1999 / 2000 to 3109 in 2004 / 2005. Elementary enrollments peaked at 1441 in 2000 / 2001, while the middle school and high school population has increased since then. Overall enrollment for 2006 / 2007 is projected to be 3091 (Waterford Public Schools 2004). Approximately 22.3 percent of the Waterford Public Schools budget is funded by revenues derived from Dominion operations at Millstone that are paid to the town of Waterford. This amounted to $7,373,494 in 2003.

The Waterford Public Schools were built between 1914 and 1958, initially, and have been remodeled and expanded over the decades many times. The seven schools comprise 557,221 square feet and 189 ac. The Board of Education is proceeding with plans to build or renovate-as-new three elementary schools. Waterford and New London have also received a $22 million grant from the State Department of Education to build an early childhood learning center for approximately 520 preschool and kindergarten aged children, half of whom will be from Waterford and half from New London. The building is to be located next to the Waterford High School. The project is scheduled to open in September 2005 (Waterford Public Schools 2004).

- **Transportation**

Waterford, New London County, and the southeastern Connecticut region have a well-developed transportation system. The area is served by an established roadway network of local, connector, arterial, and expressway routes. Rail lines operated by Amtrak provide local and long-distance high-speed train service connecting New London with Boston and New York. Intercity bus service is provided by Greyhound Lines with a stop in New London. Southeast Area Transit buses operate throughout New London County and provide local service into Waterford. The Groton / New London airport provides charter and commercial service. National air carriers serve Bradley International airport near Hartford and the T.F. Green airport in Providence, Rhode Island. Ferry service is offered from the consolidated intermodal New London terminal seasonally and year-round to several Long Island destinations; Martha's Vineyard, Massachusetts; and Block Island, Rhode Island. The mouth of the Thames River is one of New England's finest natural harbors and provides direct access to major transatlantic and coastal sea lanes.

Road access to Millstone is via the Millstone Access Road, an onsite two-lane paved road with a north-south orientation. When nearing Millstone, all employees must use State Route 156 (Rope Ferry Road), which is a two- to four-lane highway classified as an arterial road. State Route 156 intersects with U.S. 1 (Boston Post Road), which has an east-west orientation in Connecticut. Employees traveling from the towns of New London and Waterford are most likely to use U.S. 1 and State Route 156. Employees traveling from East Lyme and other communities to the west are most likely to use State Route 161 or U.S. 1, and State Route 156. State Route 161 serves as a major feeder to and from Interstate (I)-95 south. Waterford's main roadways are I-95 and I-395, U.S. 1, and State Routes 85, 156, 161 and 32. Most Millstone workers commute in their own vehicles or in organized van pools. Parking for all vehicles is provided at the site.

The major transportation issues in Waterford involve the roadway circulation system and enhancing other modes of transportation, such as pedestrian ways and bicycle paths. Overall, the community wants to address traffic needs while maintaining community character and minimizing environmental impacts. One of Waterford's major transportation challenges is to preserve the capacity of existing roadways and to maintain adequate traffic service levels given the historic and anticipated growth of traffic volumes, congestion, and accidents. Since only half the land area in Waterford has been developed, future traffic volumes could increase when new development occurs.

There are some transportation projects being conducted by State and local authorities that may improve transportation and that could impact Millstone. These include intersection improvements on U.S. 1, widening westbound Route 156 to two lanes in the vicinity of U.S. 1 to minimize traffic merging conflicts, and eventual widening of I-95. The open space plan for Waterford recommends using power transmission line ROWs (outside of the Millstone traverse) for multimodal trails (e.g., walking, bicycling).

In order to meet 10-year transportation goals, the *East Lyme Plan for Preservation, Conservation and Development* proposes a number of transportation improvements to alleviate congestion on the 219 km (136 miles) of roads in the town (Dominion 2004a). Thirty-two miles of the roads are State owned and maintained including the two major east-west routes (U.S. 1 and Route 156) and the major north-south corridor (Route 161). The proposed improvement projects having the greatest potential to impact Millstone include the upgrades of Routes 161 and 156.

The *Regional Transportation Plan for Southeastern Connecticut* contains a number of recommendations to address transportation concerns that could affect Waterford and Millstone (SCCOG 2003a). The plan notes that New London will continue to function as the region's primary transportation hub with its confluence of water, rail, and highway systems, and it cites Millstone as being the eleventh largest regional nonresidential traffic generator, and that it is

one of six high-security sites in southeastern Connecticut. The highest priority projects for southeastern Connecticut are the completion of Route 11 from Salem to I-95 and its intersection in Waterford, capacity improvements to I-95 from Branford to the Rhode Island state line, expansion of the regional bus system to address tourism and related employment demand, and improvements to Routes 2, 2A, and 32 to serve the casinos. These projects remain unfunded, except for transit improvements. Adequate public transportation for employment and other necessary travel was also identified as one of ten top priorities for southeastern Connecticut in 1999 (United Way of Southeastern Connecticut 1999).

The Connecticut Department of Transportation does not maintain level-of-service designations for the roads in the vicinity of Millstone (Dominion 2004a). Waterford strives to maintain a level-of-service standard of C or better for its roads, with exceptions made for certain commercial corridors provided that additional congestion occurs only on private driveways. Level-of-Service C means that vehicle traffic volumes are between 70 percent and 80 percent of the roadway capacity and that delays at traffic signals are between 15 and 20 seconds (Waterford 1998). In 2001, the segments of Route 156 passing by the Millstone access (at High Ridge Drive) had a volume to capacity ratio of 0.40 (SCCOG 2003a). A new traffic signal will be installed at the intersection of Route 156 and Gardiners Wood Road, and recent changes to the intersection of Route 156 at Route 213 (Great Neck Road) should mitigate the congestion experienced there at certain times of the day. Table 2-7 lists roadways in the vicinity of Millstone and the annual average number of vehicles per day, as determined by CTDEP.

2.2.8.3 Offsite Land Use

Millstone is located in the town of Waterford, a suburban community that consists primarily of owner-occupied single-family dwellings. Waterford was settled in the late 1600s and originally was part of New London. It incorporated in 1801. Waterford is one of 21 municipalities that comprise New London County. Land use in Connecticut is regulated by municipalities and each municipality is an independent government. There are no unincorporated lands in Connecticut, and counties do not have government functions such as regulation of land use. The Connecticut General Assembly recently passed legislation enabling cooperation among municipalities. Intergovernmental projects are encouraged by allowing municipalities to engage jointly in any function that they are authorized to carry out independently. Towns in New London County have made efforts to work together to address regional planning issues, such as those presented by the presence of large casinos, economic development, transportation, water supply and availability, and housing. The forum for addressing regional and intermunicipal issues is the SCCOG. It is likely that this approach to intergovernmental planning and cooperation will continue in the region where Millstone is located (Vincent 2004).

Table 2-7. Traffic Counts for Roads in the Vicinity of Millstone

	Roadway and Location	Annual Average Daily Traffic Volume[a]
(1)	Highway 156—Station Number 63 (just east of Millstone entrance near Gardiners Wood Road)	9600
(2)	Highway 156—Station Number 29 (west of Avery Road)	8900
(3)	Highway 156—Station Number 33 (east of Avery Road)	12,800
(4)	Highway 156—Station Number 44 (west of intersection with U.S.1)	14,700
(5)	Highway 156—Station Number 2190 (just west of Millstone entrance and west of High Ridge Road)	10,400
(6)	Highway 156—Station Number 2032 (west of River Street)	10,200
(7)	Highway 156—Station Number 25 (east of Highway 161)	10,300
(8)	Highway 156—Station Number 26 (west of Highway 161)	10,600
(9)	Highway 156—Station Number 27 (east of East Pattagansett Road)	9800
(10)	Highway 156—Station Number 18 (west of East Pattagansett Road)	9600
(11)	Highway 156—Station Number 33 (east of Rocky Neck Connector)	8900
(12)	Highway 161—Station Number 41 (northwest of Hope Street)	9300
(13)	Highway 161—Station Number 15 (north of Sleepy Hollow Road)	9900
(14)	Highway 161—Station Number 2010 (south of King Arthur Drive)	21,700
(15)	Highway 161—Station Number 8 (north of Boston Post Road)	11,900
(16)	Highway 161—Station Number 37 (north of Drabik Road)	6700
(17)	Highway 161—Station Number 38 (south of Walnut Hill Road)	5700
(18)	U.S. 1—Station Number 74 (east of Strosberg Road)	13,000
(19)	U.S. 1—Station Number 36 (west of Woodland Grove)	24,800
(20)	U.S. 1—Station Number 39 (southeast of Vivian Street)	25,200
(21)	U.S. 1—Station Number 35 (northwest of Vivian Street)	12,500
(22)	U.S. 1—Station Number 40 (northwest of Ellen Ward Road)	14,900
(23)	U.S. 1—Station Number 2051 (northwest of Cross Road)	9900
(24)	U.S. 1—Station Number 5034 (west of Oswegatchie Road)	9800

(a) Dominion 2004a

Section 8-23 of the Connecticut General Statutes requires each town planning commission to prepare and adopt a plan of conservation and development, and to amend, update, or readopt such plan at least every 10 years. The *Waterford Plan of Preservation, Conservation and Development* provides a vision for the future of a desired community structure, and includes a future land-use plan. The plan provides for a variety of land uses and ensures an adequate supply of land for residential, open space, and business uses. The plan also includes and designates the lands devoted for use by Millstone and associated facilities. The town also has regulations governing lot sizes and places restrictions on multifamily development densities.

The Atomic Energy Commission, predecessor to the NRC, noted that the general character of land use at the time of Millstone construction during the 1970s was scattered villages and homes except for the towns of Groton, New London, and Norwich. In the southeastern Connecticut planning region, 86 percent of the land area was classified as undeveloped. In 1990, developed uses accounted for 20.5 percent of the total land area, and, in 2000, the developed area was 25 percent.

In the decade between 1990 and 2000, development grew at a rate of about 22 percent, which is comparable to the 1980s. Suburban towns like Waterford accommodated most of this growth in developed lands. Residential uses have historically been the dominant component of developed uses and this trend continued during the 1990s. While there was population growth in southeastern Connecticut of about 1 percent, there was a 39 percent increase in land area consumed for residential development. Decreasing household size may be a contributing factor, but other public policies and preferences result in low-density residential development being the predominant land use in southeastern Connecticut. While intensive industrial and commercial uses increased in geographic area, these remained fairly constant as a percentage of the total developed lands between 1980 and 2000. Lands used for transportation, communication, and utilities comprise approximately 21 percent of all developed lands in 2000, and total land used for this increased since 1990; however as a relative percentage to total developed lands in 2000, these lands decreased by 4 percent. Lands used for open space and active recreation, including agricultural uses, account for approximately 19.5 percent of the land area at the regional level, which represents a slight increase from 1990. The most common use (about 68 percent) within this category is public-private preserves and the holdings of water utilities, while agricultural lands comprise about 19 percent of this category. Undeveloped land (mostly vacant forests, fields, wetlands or bodies of water) covered 55.5 percent of the lands of southeastern Connecticut in 2000, compared to 61 percent in 1990. This equates to 1 percent of the total land area of the region being developed every two years, which implies major changes to land use in the coming decades (SCCOG 2002). Table 2-8 provides a summary of land use in southeastern Connecticut.

There are 610 farms in New London County comprising 27,500 ha (67,924 ac) or an average of 45 ha (111 ac). In contrast, there are 288 farms in Middlesex County totaling 7560 ha

(18,682 ac) and averaging 26.3 ha (65 ac) (USDA 1997). Farms in New London County accounted for nearly 15 percent of all farms in the State, and they tended to be larger, on average, while the farms in Middlesex County were about half the size on average of those in New London County. The number of farms reported in Connecticut remained at 4200, between 2001 and 2003. The average size of a Connecticut farm was 34.8 ha (86 ac) (USDA 2004).

2.2.8.4 Visual Aesthetics and Noise

Prior to development as a power facility, Millstone Point was the site of a granite quarry that operated for approximately two centuries, until 1960. Current station facility features include reactor containment buildings, auxiliary buildings, intake and discharge structures, turbine buildings, a radioactive waste facility, fuel handling buildings, the electrical switchyard and associated transmission lines, an environmental laboratory, and training facilities.

Table 2-8. Land Use in Southeastern Connecticut

Land Use	km^2	mi^2	Percent of Total
Total Developed	361.2	139.5	24.9
Residential	222.0	85.7	15.3
Industrial	12.4	4.8	0.9
Commercial	15.0	5.8	1.0
Institutional	35.7	13.8	2.5
Transportation and Utilities	76.1	29.4	5.3
Open Space	191.7	74.0	13.2
Active Recreation	36.8	14.2	2.5
Agriculture	54.4	21.0	3.8
Native American	12.7	4.9	0.9
Undeveloped	295.6	305.4	54.6
Total	**656.8**	**559.5**	**100.0**

Source: SCCOG 2002.

The Millstone site maintains a low profile when viewed from locations further inland and upland in Waterford. It is plainly visible from the waters of Long Island Sound, from the shoreline of the Pleasure Beach neighborhood, and from across Niantic Bay. The 114-m (375-ft) tall red and white stack and a meteorological tower are the most visible features when passing by the site on Rope Ferry Road. Loud noises are occasionally heard in Waterford from Millstone, but noise is generally not an issue because the actual facilities are located within an exclusion and buffer zone on a peninsula that is distant from houses.

2.2.8.5 Demography

- **Resident Population within 80 km (50 mi)**

Population was estimated within an 80-km (50-mi) radius of Millstone. Four states and all or parts of 15 counties fall within this radius. The city of Hartford, and sections of the Hartford and the New London-Norwich Metropolitan statistical areas are also located within 80 km (50 mi) of Millstone. There are eight counties in Connecticut, four counties in Rhode Island, two counties in Massachusetts and one county in New York.

An estimated 2,868,207 people live within this area. This equates to a population density of 219 persons per square kilometer (persons/km^2) (567 persons per square mile [persons/mi^2]). Applying the GEIS proximity measures, Millstone is classified as Category 4 (greater than or equal to 73 persons/km^2 [190 persons/mi^2] within 50 miles). According to the GEIS sparseness and proximity matrix, Millstone's rank of sparseness, Category 4, and proximity, Category 4, result in the conclusion that Millstone is located in a high-population area (Dominion 2004a). Another estimate of population densities for 2000 (SCCOG 2003b) reports that there are 168 persons/km^2 (434 persons/mi^2) within the southeastern Connecticut planning region, which falls within the 80-km (50-mi) radius from Millstone, while Waterford has a density of 221 persons/km^2 (573 persons/mi^2), compared with New London where 1802 persons occupy each square kilometer (4667 persons/mi^2) (SCCOG 2003b). Table 2-9 shows population growth rates and projections for New London County and Connecticut from 1980 to 2040. Table 2-10 provides more detail about the population growth in the vicinity of Millstone between 1980 and 2000.

The Hartford Metropolitan Service Area is the 42nd largest Metropolitan Service Area in the United States with a population of 1,183,110 residents. The New London-Norwich Metropolitan Service Area, which contains New London County, has a total population of 293,566, making it the 134th largest Metropolitan Service Area in the United States. Since 1980, New London County has had an annual average growth rate of only 0.4 percent. From a regional perspective, the population of southeastern Connecticut continues to move from the urban to the suburban and rural areas. The Waterford population growth rate is the same as the county's, 0.4 percent. Groton and New London have lost population, while Colchester, East Lyme, Ledyard, and Montville have gained population. The southeastern Connecticut region as a whole grew by 2327 persons between 1990 and 2000. The natural increase (births minus deaths) for this period was 14,160 persons while 11,833 persons migrated out of the region. Waterford experienced a negative natural increase (more deaths than births), but there was a net in-migration that caused a total population gain. Waterford had a population of 19,152 in 2000, compared to 17,930 in 1990 (SCCOG 2003b).

Table 2-9. Population Growth and Trend in Connecticut and New London County 1980 to 2040

	Connecticut		New London County	
Year	Number	Percent	Number	Percent
1970	3,031,709	--	230,348	--
1980	3,107,576	0.25	238,409	0.35
1990	3,287,116	0.58	254,957	0.70
2000	3,405,565	0.36	259,088	0.16
2010	3,533,269	0.37	271,393	0.47
2020	3,663,379	0.37	281,669	0.38
2030	3,793,490	0.36	291,946	0.36
2040	3,923,601	0.34	302,223	0.35

Source: Dominion 2004a

Table 2-10. Population Growth in Vicinity of Millstone 1980 to 2000

Region	1980	1990	2000	AAGR[a] 1980–2000
Connecticut	3,107,580	3,287,116	3,405,565	0.5%
County				
New London County	238,410	254,957	259,088	0.4%
Town				
Colchester	7761	10,980	14,551	3.2%
East Lyme	13,870	15,340	18,118	1.3%
Groton	41,072	45,144	39,907	–0.1%
Ledyard	13,725	14,913	14,687	0.3%
Montville	16,455	16,673	18,546	0.6%
New London	28,843	28,540	25,671	–0.6%
Waterford	17,843	17,930	19,152	0.4%

Source: Dominion 2004a
(a) AAGR: Annual Average Growth Rate.

- **Transient Population**

The population within a 16-km (10-mi) radius of Millstone increases seasonally as a result of an influx of approximately 10,500 summer residents (Dominion 2004a). Similarly, the population of Eastern Suffolk County on Long Island increases by at least an additional 121,876 summer residents (Suffolk County Department of Planning 2005). Many of the beaches and recreation areas are popular regional and national tourist destinations, and during the summer months, they become sites inhabited by nonresidents, leading to a shift in population numbers. Some of these attractions are the Ocean Beach Park and boardwalk, Mystic Seaport and aquarium, the New London annual waterfront festival, evening summer concerts at Harkness State Park, and the Coast Guard Academy. Other area establishments such as the Crystal Mall in Waterford, and the two nearby casinos—Foxwoods and Mohegan Sun—attract thousands of daily visitors throughout the year.

- **Migrant Labor**

Migrant farm workers are individuals whose employment requires travel to tend or harvest agricultural crops. Migrant workers travel, and they can temporarily spend a significant amount of time in an area without being actual residents. Therefore, they may be unavailable for census takers to count. If this occurs, migrant workers will be underrepresented in U.S. Census Bureau minority and low-income population counts. Migrant workers are typically members of minority or low-income populations. While there are not significant numbers of migrant agricultural workers in New London County and the region, according to the United Way of Southeastern Connecticut, there are large numbers of low-paid, mostly Asian, service workers who live in the Norwich area and who are employed at the casinos. Many of these casino workers became unemployed in New York City after September 11, 2001, and came from New York City to take advantage of service jobs. They often occupy crowded households and share the same sleeping quarters.

2.2.8.6 Economy and Taxes

There have been structural changes to the economy of southeastern Connecticut during the past decade. The region has experienced a reduction of defense related and manufacturing employment and a boom in casino related development and employment that is altering the fundamental economics of southeastern Connecticut (SCCOG 1997).

The median household income for New London County was $50,646 in 1999 and lagged behind the State-wide median of $53,935 by 6.5 percent. However, the median household income gap between New London County and Connecticut was greater in 1989, when it lagged by 11 percent. Median household income in 1999 for towns in southeastern Connecticut ranged from a high of $58,750 in Salem to a low of $33,809 in New London. In Waterford, it

was $56,047. There were 15,349 persons (6.3 percent of the population) classified as living below the poverty threshold in 1999 in southeastern Connecticut. This represented an increase of 2.6 percent from 14,954 persons in 1989 and contrasts with the decade between 1979 and 1989 when the number of persons classified as living below the poverty level threshold dropped by 18.2 percent. In 1999, 789 people living in Waterford were classified as living below the poverty threshold, an absolute increase of 206 people since 1989. In contrast, the actual total number of families that are living below the poverty threshold decreased in southeastern Connecticut from 3116 in 1989 to 2943 in 1999. The greatest concentration of low-income population is in the three urban towns of Groton, New London, and Norwich, which account for approximately two-thirds of the region's poverty population (SCCOG 2003b).

The 2000 U.S. Census reported that southeastern Connecticut had a combined civilian and military workforce of 128,677, which represents a labor force participation rate of 68 percent. The southeastern Connecticut employed labor force is similar to that of the State as a whole, with a few exceptions. There is a lower proportion of workers in the finance, insurance, and real estate category, 4.1 percent in southeastern Connecticut compared to 9.8 percent in the State; and the proportion of arts, entertainment, recreation, accommodation, and food service workers was twice that of the State, 15.9 percent compared to 6.7 percent. Unemployment statistics from the 2000 census indicate that 5192 individuals, or 4.3 percent of the total civilian labor force 16 years and older in the region, were unemployed, compared to 5.9 percent in 1990. The town of New London had the highest unemployment rate at 7.4 percent, while 3.6 percent were unemployed in Waterford (SCCOG 2003b).

Casinos are now the largest employers in southeastern Connecticut, casino jobs having more than replaced in number the defense and manufacturing jobs lost during the 1990s. Defense and manufacturing still employ approximately 12,000 people in the New London labor market area, and more than 10,000 work at the U.S. Naval Submarine Base in Groton, and the pharmaceutical firm Pfizer had 6200 employees in 2000 (Southeastern Connecticut Enterprise Region Corporation 2000). Millstone is among the top ten corporate employers in the region and has a substantial economic impact on New London County. Table 2-11 lists major corporate employers in southeastern Connecticut.

Millstone's economic contribution between April 2001 and April 2002 was $515.2 million in New London County. The main contribution of Millstone was salaries. Direct and indirect compensation accounted for $118.3 million paid to employees residing in New London County during this period. In 2004, the average salary with benefits for a permanent employee at Millstone was $100,256, which was 50-percent higher than the average for New London County. In 2001, Millstone purchases in New London County were $34 million (Nuclear Energy Institute 2004).

Table 2-11. Major Employment Facilities in Southeastern Connecticut

Firm	Number of Employees
Foxwoods Resort Casino	11,500
U.S. Naval Submarine Base	10,119
Mohegan Sun Resort	10,000
Electric Boat	9000
Pfizer Pharmaceuticals	6200
Lawrence and Memorial Hospitals	2000
Millstone Power Station	**1650**
Backus Hospital	1500
U.S. Coast Guard Academy	1342
Connecticut College	900
Davis Standard—plastic extrusion equipment	650
Westerly Hospital	634
Computer Sciences Corporation	600
Franklin Mushroom Farms	595
Southern New England Telephone	528
Bess Eaton Donut Flour Company	405
S & S Worldwide—crafts, games, elderly aids	400
The Day Publishing Company—newspaper	395
Washington Trust	340
Mystic Seaport	330
Analysis and Technology—engineering and technical systems	325
Wyman-Gordon—casings	315
Ortronics—telecommunications	310
The Moore Company— fabrics	300
Sonalysts — sonar/film and audio studios	275

Source: Southeastern Connecticut Enterprise Region Corporation 2000: Area Survey of Employers April 2000 and May 2004

Millstone pays annual taxes to the towns of Waterford and East Lyme, both located in New London County. The majority of tax payments are made to Waterford ($13.5 million in 2002), but East Lyme receives a small tax payment for the plant's Information and Science Center ($5332 in 2002). Tax revenues fund Waterford's General Fund which supports programs such

as the Waterford Public Schools, the library, public works, public health programs, emergency management services, the police and fire departments, parks and recreation, planning and land use commissions, the retirement commission, and others (Dominion 2004a).

For the assessment years 1996 to 1999, Millstone taxes averaged $34.8 million per year and represented 64 to 69 percent of Waterford's total tax revenues. The State enacted legislation in 1998 restructuring the electric power industry. One result of the legislation was that Millstone tax payments would be assessed using fair market value instead of net book value methodologies. Millstone property tax payments dropped to $11.7 million in 2000, representing approximately 36 percent of Waterford's tax revenues. The State legislature passed a program called the Systems Benefit Charge, designed to reimburse affected towns such as Waterford for revenues lost by the change in assessment methodologies for electric power utilities. Eventually (as the program phases out after 2010), lost revenues will need to be recouped through millage rate increases and budget adjustments (Dominion 2004a). Table 2-12 compares Millstone's tax payments to Waterford's total tax revenues from 1996 to 2000.

Table 2-12. Millstone Tax Payments to Waterford 1996 to 2000

Year	Waterford Grand List Tax Revenues[a]	Tax Paid by Millstone Power Station	Percent of Waterford Tax Revenues
1996	$50,310,334	$34,768,749	69
1997	$50,436,903	$34,163,131	68
1998	$50,570,691	$33,495,022	66
1999	$52,548,808	$33,725,414	64
2000	$32,448,775[b]	$11,738,993	36

Source: Dominion 2004a.
(a) Taxes collected after adjustments (such as abatements, etc.). Grand List includes real estate, personal property, and motor vehicle taxes.
(b) Assessment year 2000 revenue does not include the State program reimbursement.

Waterford commissioned and completed a study to investigate budget and service delivery options in 2000. The *Town of Waterford Long Range Financial Management Plan* provides a toolkit with over 140 recommendations to assist the town of Waterford and the Waterford Public Schools to control and reduce costs using service delivery strategies and methods implemented through aggressive management of organizational performance (Waterford 2000a).

2.2.9 Historic and Archaeological Resources

This section discusses the cultural background and the known historic and archaeological resources at the Millstone site and in the surrounding area. This section draws on information

contained in the Environmental Report prepared by Dominion (Dominion 2004a), from archives and records stored at the Connecticut Historical Commission office in Hartford, as well as from published literature that treats the archaeology and history of Connecticut.

2.2.9.1 Cultural Background

The nearest established major cultural or historic park to Millstone is that of Ft. Trumbull State Park overlooking the Thames River about 8 km (5 mi) northeast of Millstone. Ft. Trumbull is the location of a series of coastal military forts dating back to the Revolutionary War.

As of May 2004, there are four Federally recognized Native American tribes in Connecticut and one in neighboring Rhode Island with possible historic ties to the general Millstone area. These include the Mohegan Tribe along the Thames River near Uncasville, approximately 14-km (9-mi) northeast of Millstone; the Mashantucket Pequot Tribal Nation in Ledyard, approximately 19-km (12-mi) north of Millstone; the Eastern Pequot Tribe in North Stonington, approximately 29-km (18-mi) northeast of Millstone; the Schaghticoke Tribal Nation in Kent, approximately 113-km (70-mi) northwest of Millstone; and the Narragansett Indian Tribe of Charlestown, Rhode Island, approximately 45-km (28-mi) east of Millstone. In addition to these Federally recognized tribes, there are several State-recognized tribes in Connecticut.

In the portions of the eastern coastline of Connecticut that are still largely undisturbed by historic and modern development, a rich heritage of prehistoric and early historic Native American resources and of historic Euroamerican resources is present (Van Dusen 1961; Keegan and Keegan 1999; Kerber 2002). Much of the information about Waterford is derived from Bachman (2000), while Millstone information is derived from a manuscript on the local quarrying industry (Reed 1994), and from a 1998 archaeological assessment survey of Waterford.

This area has an archaeological sequence that extends back at least 12,000 years before the present. The cultural history can be divided into four major periods: Paleoindian (10,000 before Christ [B.C.], and perhaps as early as 13,000 B.C., to around 7000 B.C.), Archaic (7000 to 700 B.C.), Woodland (700 B.C. to around Anno Domino [A.D.] 1650), and Historic (A.D. 1650 to the present). The Woodland period and the early portion of the Historic period are sometimes referred to as the Contact period.

During the Paleoindian period, the native peoples likely were organized into small mobile bands with a hunting and a fishing based economy. The Paleoindian climate was cooler than at present, with the presence of glaciers leading to much lower ocean levels. Thus, many of the archaeological sites along the coast dating from this time period would today be underwater, although a late Paleoindian site has been documented on Mashantucket Pequot tribal lands.

The Archaic period is typically divided into three components: Early, Middle, and Late Archaic, sometimes with a fourth component called Terminal Archaic. The greatest change came about during the Middle Archaic when ocean levels reached or even slightly exceeded current levels. Middle and Late Archaic archaeological sites typically exhibit greater evidence of sedentary economies, such as the presence of storage pits, extensive refuse middens, and large quantities of fire cracked rock. Habitation sites appear to have been divided into base camps used most of the year and smaller upland sites used during the fall.

In the Woodland period, Native American cultures reached their modern configurations, as noted at the time of initial European contact in the 1500s and 1600s. The increasing dependence on agriculture resulted in the development of increasingly complex trade networks and political systems and two major technological adaptions: use of ceramic containers and the bow and arrow. Woodland period archaeological sites are much more numerous throughout southern New England than are the earlier Archaic period sites. New England, for the most part, did not witness the complex Mississippian culture societies (e.g., Bense 1994) that developed immediately to the west and south of New England.

Prior to historic European contact, the ancestors of the modern southern New England Indians lived in a number of small distinct Algonquin-speaking Woodland culture societies. The Niantic occupied the area around Millstone. Around A.D. 1500, the Pequot, including the Mohegans, moved into eastern Connecticut, including the Millstone area, likely from the Hudson River Valley in New York, effectively dividing the Niantic into two bands, Eastern and Western Niantic. The Narragansett lived nearby in Rhode Island. In western Connecticut were the Mattabesic tribes, who spoke a dialect of Algonquin distinct from that of the Pequots, Mohegans, Niantics, and Narragansetts. The Pequot were aggressive and warlike and soon came to dominate much of Connecticut. The Algonquin word "quinnetukut" meant "on the long tidal river" in reference to the Connecticut River.

The Historic period for Connecticut can be roughly divided into eight subperiods: Contact (1614 to 1690), Colonial (1690 to 1764), Revolutionary War (1764 to 1783), Constitutional (1783 to 1850), Civil War Era (1850 to 1865), Reconstruction and Growth (1865 to 1917), World War I to World War II (1917 to 1945), and Modern (1945 to present).

The Historic period of Connecticut begins in 1614 with the exploration of the Connecticut River Valley by the Dutch explorer Adriaen Block. In 1633, the Dutch built a small fort in Hartford and the English founded the nearby city of Windsor. This marked the beginning of more than 100 years of population dislocation and cultural extirpation in Connecticut, ultimately resulting in amalgamations of native peoples previously distinct from one another and distributions that reflected the nature of European encroachment and economic systems, rather than the traditional patterns of the native populations.

In 1682, an amalgamation of Narragansetts and Eastern Niantics was allowed to settle and create the present Narragansett reservation in Charlestown, Rhode Island, and was given Federal recognition in 1983. An amalgamation of Mohegan Pequots together with the Western Niantics, lived variously in Connecticut and Wisconsin. In 1994, the surviving Mohegans were given Federal recognition. The Eastern Pequots were given Federal recognition in 2002. The Mattabesic tribes of western Connecticut were eventually largely amalgamated with the Mohegan, but a small surviving group composed of several Mattabesic tribes eventually became the Schaghticoke who received Federal recognition in 2004.

In the period between 1690 and 1764, all of the colonies, including Connecticut, witnessed growth as well as periodic boundary disputes with neighboring colonies. A population surge then occurred in Connecticut with the town of New London just east of Millstone increasing to a size of 5888 residents by 1774.

During the Revolutionary War, the British raided Danbury in 1777 and Greenwich in 1779, with major battles at Fort Trumbull and Fort Griswold. Connecticut primarily was involved by supplying troops and by provisioning the Continental Army during the Revolutionary War.

The period between 1790 and 1850 witnessed the dual processes of emigration from New England westward, and the growth of cotton and other manufacturing and banking industries in Connecticut. Connecticut once again became a provisioner during the Civil War, with the tiny port of Mystic being second only to Boston in terms of adding ships to the Federal Navy.

Between the Civil War and World War I, the communities around Millstone began to flourish and reached their modern configurations. During this period, Millstone served as a granite quarry for much of the construction in the surrounding cities.

In 1651, John Winthrop acquired more than 600 acres at Millstone Point. Winthrop did not live at the Millstone Point, but instead used the land for pasturage. He gave the land to his daughter and son-in-law in 1655, and it remained in the family until approximately 1723. The new owner, Peter Buor, began quarrying operations at about that time. In 1788, the quarry was purchased by Benajah Gardiner, and it remained in the Gardiner family until purchased in 1951 by Northeast Utilities, Dominion's predecessor to power generation operations at Millstone Point. The Millstone quarry was one of seven quarries that were developed in the Waterford area. It remained the largest and most active of the seven, and was the last to cease operations.

Groundbreaking for the power facility at Millstone began in December 1965, with construction on Unit 1 commencing in 1966, at Unit 2 in 1970, and at Unit 3 in 1974. Actual power generation at Unit 2 began in 1975. The old Millstone quarry, used for nearly two centuries, was opened to the ocean and converted into a cooling area for water discharge.

2.2.9.2 Historic and Archaeological Resources at and near Millstone

As of 2002, 181 properties in New London County were listed in the National Register of Historic Places, with 62 falling into a radius of 10 km (6 mi) of the Millstone facility (Dominion 2004a). None of these properties are on the Millstone site.

An archaeological records search was conducted through the use of the 1998 archaeological assessment survey for Waterford (Harper et al. 1998), and a general literature review was conducted at the Waterford Public Library. In addition, meetings were held with the Waterford town historian, Robert Nye, and with knowledgeable Millstone staff.

The earliest archaeological sites at Waterford date to the Late Archaic period, probably dating to around 4500 to 3700 years ago. Middle Woodland (around 2000 to 1200 years ago) and Late Woodland (around 1200 to 400 years ago) were the most commonly represented pre-European time periods.

There are two areas within the Millstone site known to have been the locale of pre-European Native American village habitations, both of which have been largely destroyed by historic farming and construction activities. One was situated a few hundred meters inland from Niantic Bay immediately north of the railroad bed that transects Millstone. The other site is located adjacent to Jordan Cove, with possibly intact deposits being preserved within the 20-ha (50-ac) wildlife refuge maintained by Dominion.

Among known Historic period resources at the Millstone site are a stone lined, slab covered, circular well and a small stone slab bridge spanning a brook. The well is of an unknown date, but the bridge is located at the point depicted on a 1868 map, where an old trail or road intersects the historic Gardiners Wood Road, in the vicinity of a depicted house. Both of these properties were added to the State files at the Connecticut Historic Commission in 1998. Also present but not formally documented in undeveloped portions of the Millstone site are a number of historic stone boundary walls, many of which are depicted on current maps of the Millstone site along with a second stone lined, slab covered well north of the railroad bed on the western side of the Millstone site. An unstudied homestead site is located in the northwest corner of the Millstone site, not far from a small historic cemetery. Tombstones in the cemetery range in date between 1794 and 1862.

The most important archaeological site at the Millstone site is the granite quarry itself. Quarrying operations likely began sometime shortly after 1723, with millstones being produced for local use, but some also being shipped as far as the West Indies. By 1776, on postal route maps of Benjamin Franklin, the area was already referred to as Millstone Point. By the mid 1830s, quarrying activities shifted from the manufacture of millstones to the use of blocks for major construction projects. During the next 20 years, Millstone quarry granite was used for

a number of coastal military forts including Adams, McAllister, Schuyler, Sumter, and Trumbull, along with the West Point Military Academy. By 1847, the Millstone quarry employed a workforce of 25 men and shipped some 30,000 tons of granite a year to cities such as New York, Philadelphia, and Charlestown. By the 1870s, the workforce had increased to more than 300 men. Millstone quarry granite was used for Mexico City's grand square, for Grand Central terminal, for the foundations of the Supreme Court building and the United Nations building, and for the base of the Statue of Liberty. Millstone quarry granite was also used for gravestones and for railroad construction.

In the late 1800s, a number of support facilities for the workers existed at the quarry, including offices, a boarding house, and a school. Virtually none of these facilities remain intact today, nor are their original locations well known. The wood framed school building still stands on the Millstone site, and although removed from its original location and moved at least twice, it serves as a reminder of earlier quarrying operations at Millstone Point. The quarrying operations appear to have lasted until 1963. As previously mentioned, the southern wall of the quarry pit was subsequently breached to let in waters from Long Island Sound in order to serve as a water discharge cooling pond for the Millstone nuclear plant operations.

As previously mentioned, the Mohegan Tribe, located along the Thames River near Uncasville, is the closest Federally recognized tribe to Millstone. Its reservation land is approximately 14 km (9 mi) northeast of the facility. The Mashantucket Pequot Tribal Nation in Ledyard is approximately 19 km (12 mi) north of Millstone; the Eastern Pequot Tribe in North Stonington is approximately 29 km (18 mi) northeast of Millstone; the Schaghticoke Tribal Nation in Kent is approximately 113 km (70 mi) northwest of Millstone; and the Narragansett Indian Tribe of Charlestown, Rhode Island, is approximately 45 km (28 mi) east of Millstone. With the possible exception of the Schaghticoke Tribal Nation, these tribes would all likely consider themselves culturally affiliated to the Millstone area.

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 operating licenses for Millstone. Any such activities could result in cumulative environmental impacts and the possible need for the Federal agency to become a cooperating agency for the purpose of preparation of the SEIS.

There are several projects that have received or may receive Federal funding in the southeastern Connecticut planning region. A $2 billion upgrade to Amtrak's northeast corridor between Boston and New York City was completed recently to enable high-speed train travel. This rail line bisects the Millstone site but provides no access to or station within Waterford. The closest stop is in New London. Roadway improvements to connect Route 11 with I-95 in Waterford and to increase the capacity of I-95 in southeastern Connecticut would require

Federal funding, but these roadway projects remain unfunded despite their high priority in the regional transportation plan. The recently approved Thames Basin Regional Water Interconnection Project will provide alternative water supply sources for Waterford by interconnecting the Norwich, Groton, and the New London/Waterford systems. This project is to be partially funded with Federal matching dollars. The State pier and foreign trade zone in New London was also Federally funded. This multimodal facility is intended to serve freight and passengers, as well as fishing and marine research. Cruise ships are now stopping in New London.

The next proposed round of Defense Department base realignment and closures could affect southeastern Connecticut if the submarine base at Groton were to be reduced in size or closed. This could result in the closing of related industries and have a magnified negative impact on businesses and the economy of the region. A comprehensive economic development strategy is being prepared to analyze options and scenarios for southeastern Connecticut.

The disposition of the old Norwich State Hospital is a State project. The State and Preston town have agreed to terms of an agreement to allow Utopia Studios to build an entertainment complex on the190-ha (470-ac) site. While not a Federal project or action, the ultimate reuse of this site could affect the region by impacting housing, transportation, and economic development.

NRC is required under Section 102(a) 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. The staff has determined that there are no Federal projects or activities in the vicinity of Millstone that would result in cumulative impacts or would make it desirable for another Federal agency to become a cooperating agency for the purpose of preparing this SEIS.

2.3 References

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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 supplemental environmental impact statement (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 conclusions could not be reached for the above criteria for all plants, or for specific classes of plants, are Category 2 issues. These are listed in Table 3-2.

(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.

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 the Millstone Power Station, Units 2 and 3 (Millstone) because they are related to plant design features or site characteristics not found at Millstone 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. Dominion Nuclear Connecticut, Inc. (Dominion) indicated that it performed its integrated plant assessment, the evaluation of structures and components pursuant to 10 Code of Federal Regulations (CFR) 54.21, to identify activities that are necessary to continue operation of Millstone 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 License Renewal Applications (Dominion 2004a). In its Environmental Report for Millstone, Dominion stated that it "has not identified the need to undertake any major refurbishment of replacement actions to maintain the functionality of important systems, structures, and components during the Millstone license renewal period" (Dominion 2004b). Therefore, refurbishment is not considered in this supplemental environmental impact statement.

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.

3.1 References

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

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

Dominion Nuclear Connecticut, Inc. (Dominion). 2004a. *Applications for Renewed Operating Licenses, Millstone Power Station, Units 2 and 3.* Waterford, Connecticut.

Dominion Nuclear Connecticut, Inc. (Dominion). 2004b. *Applicant's Environmental Report — Operating License Renewal Stage Millstone Power Station, Units 2 and 3.* Waterford, Connecticut.

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 (U.S. Nuclear Regulatory Commission [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 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 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 Code of Federal Regulations (CFR) Part 51, Subpart A, Appendix B and are applicable to the Millstone Power Station, Units 2 and 3 (Millstone). Section 4.1 addresses issues applicable to the Millstone cooling system. Section 4.2 addresses issues related to transmission lines and onsite 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 ground-water 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 Section 4.8 discusses cumulative

(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.

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 Millstone because they are related to plant design features or site characteristics not found at Millstone 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 Millstone cooling system operation during the renewal term are listed in Table 4-1. Although

Table 4-1. Category 1 Issues Applicable to the Operation of the Millstone 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
Altered salinity gradients	4.2.1.2.2
Scouring caused by discharged cooling water	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 waste water	4.2.1.2.4
Water use conflicts (plants with once-through cooling systems)	4.2.1.3
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
Thermal plume barrier to migrating fish	4.2.2.1.6
Distribution of aquatic organisms	4.2.2.1.6
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
HUMAN HEALTH	
Noise	4.3.7

the Dominion Nuclear Connecticut Inc. (Dominion) Environmental Report (ER) (Dominion 2004a) identified altered current patterns at intake and discharge structures (surface water) as a nonapplicable Category 1 issue, the staff determined that it is applicable. Dominion stated in its ER (Dominion 2004a) that it is not aware of any new and significant information associated with the renewal of the Millstone Power Station, Units 2 and 3 operating licenses (OLs). The staff has not identified any new and significant information during its independent review of the Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft supplemental environmental impact statement (SEIS). 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 would be 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. (For each issue below, references to the Dominion ER are to Dominion 2004a.)

- 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there are no impacts from altered current patterns at intake and discharge structures during the renewal term beyond those discussed in the GEIS.

- Altered salinity gradients. Based on information in the GEIS, the Commission found that

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

  The staff has not identified any new and significant information during its independent review of the Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff

concludes that there are no impacts from altered salinity gradients 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 Dominion ER, the staff's site visit, the scoping process, its review of monitoring programs, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from scouring caused by discharged cooling water 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information including the National Pollutant Discharge Elimination System (NPDES) permit for Millstone, discussion with the Connecticut Department of Environmental Protection (CTDEP), and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other

available information including the NPDES permit for Millstone, discussion with the CTDEP, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from discharge of sanitary wastes and minor chemical spills during the renewal term beyond those discussed in the GEIS.

- Discharge of other metals in waste water. 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information including the NPDES permit for Millstone or discussion with the CTDEP, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from discharge of other metals in waste water during the renewal term beyond those discussed in the GEIS.

- Water use conflicts (plants with once-through cooling systems). Based on information in the GEIS, the Commission found that

  > These conflicts have not been found to be a problem at operating nuclear power plants with once-through heat dissipation systems.

  The staff has not identified any new and significant information during its independent review of the Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from water use conflicts for plants with once-through cooling systems 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from 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 Dominion ER, the staff's site visit, the scoping process, its review of monitoring programs, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from 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 affect the larger geographical distribution of aquatic organisms.

  The staff has not identified any new and significant information during its independent review of the Dominion ER, the staff's site visit, the scoping process, its review of monitoring programs, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from 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.

In 1972, the applicant reported a fish kill of Atlantic menhaden that might be attributed to gas bubble disease that occurred in the quarry. It is also possible that the fish kill was the result of heat stress or a combination of heat stress and gas bubble disease. In response to the event, the licensee installed a fish barrier at the quarry entrance to Long Island Sound. The barrier is designed to prevent fish from swimming into the quarry. Since installation of the fish barriers, the licensee has not observed any gas bubble disease-related fish kills in the quarry.

The staff has not identified any new and significant information during its independent review of the Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from 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 Dominion ER, the staff's site visit, the scoping process, its review of monitoring programs, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts of losses from predation, parasitism, and disease among organisms exposed to sublethal 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from stimulation of nuisance 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from noise during the renewal term beyond those discussed in the GEIS.

The Category 2 issues related to cooling system operation during the renewal term and applicable to Millstone are discussed in the sections that follow and listed in Table 4-2.

Table 4-2. Category 2 Issues Applicable to the Operation of the Millstone 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
AQUATIC ECOLOGY (FOR PLANTS WITH ONCE-THROUGH AND COOLING POND HEAT-DISSIPATION SYSTEMS)			
Entrainment of fish and shellfish in early life stages	4.2.2.1.2	B	4.1.1
Impingement of fish and shellfish	4.2.2.1.3	B	4.1.2
Heat shock	4.2.2.1.4	B	4.1.3

4.1.1 Entrainment of Fish and Shellfish in Early Life Stages

For power plants with once-through heat-dissipation systems, the entrainment into nuclear and power plant associated cooling-water systems of fish and shellfish in early life stages is considered a Category 2 issue, requiring a site-specific assessment before license renewal.

The staff independently reviewed the Millstone Units 2 and 3 ER, visited the site, and reviewed the applicant's NPDES permit. The staff also reviewed relevant scientific articles and agency documents from CTDEP and NOAA (National Oceanic and Atmospheric Administration) Fisheries (also known as National Marine Fisheries Service [NMFS]). The staff also interviewed agency staff from CTDEP and NOAA Fisheries and a faculty member at the University of Connecticut who has conducted research on entrainment at Millstone.

Section 316(b) of the Clean Water Act (CWA) requires that the location, design, construction, and capacity of cooling-water intake structures reflect the best technology available for minimizing adverse environmental impacts (33 United States Code [USC] 1326). Entrainment of fish and shellfish into the cooling-water system is a potential adverse environmental impact.

On July 9, 2004, the U.S. Environmental Protection Agency (EPA) published a final rule in the Federal Register (69 FR 41575) addressing cooling-water intake structures at existing power plants whose flow levels exceed a minimum threshold value of 189 million liters per day(L/d) (50 million gallons per day [gpd]). This rule is Phase II in EPA's development of 316(b) regulations establishing national requirements applicable, in existing facilities, to the location, design, construction, and capacity of cooling-water intake structures that exceed the threshold value for water withdrawals. The EPA requirements, which are implemented through NPDES permits, are designed to minimize the adverse environmental impacts associated with the continued use of the intake systems. Licensees will be required to demonstrate compliance with the Phase II performance standards in accordance with the provisions of the new rule.

Licensees may be required to alter the intake structure, redesign the cooling system, modify station operation, or take other mitigative measures as part of the NPDES permit renewal process. The new performance standards are designed to reduce entrainment losses due to plant operation. Any required site-specific mitigation would be expected to result in less impact from entrainment during the license renewal period.

As a condition of the NPDES permit issued in 1992, the CTDEP required Northeast Utilities Service Company (NUSCO) to conduct entrainment studies of winter flounder (*Pseudopleuronectes americanus*) and to submit a feasibility study on alternatives to reduce entrainment of larvae. The CTDEP approved the feasibility study, but required that NUSCO "... continue efforts to schedule refueling outages to coincide with the period of high winter flounder abundance at the intake..." and "continue to monitor Niantic River winter flounder population characteristics, in accordance with [the terms of the NPDES permit]" (CTDEP 1994).

NUSCO filed an NPDES permit renewal application in 1997. In 1999, the CTDEP notified Dominion that Millstone's once-through cooling might no longer represent the best technology available to minimize entrainment of aquatic eggs and larvae. Because of the possibility that Millstone was adversely impacting the local population of winter flounder, and the availability of new technologies to minimize entrainment, the CTDEP required that NUSCO submit "a new evaluation of all measures available to eliminate or minimize the use of once-through cooling water" prior to reissuance of the Millstone NPDES permit (CTDEP 1999). At the request of the CTDEP, the study scope included an assessment of winter flounder, tautog (*Tautoga onitis*), Atlantic menhaden (*Brevoortia tyrannus*), anchovies (*Anchoa* spp.), grubby (*Myoxocephalus aenaeus*), cunner (*Tautogolabrus adspersus*), and American sand lance (*Ammodytes americanus*). Dominion submitted the study (Dominion 2001a) to CTDEP in August 2001. Dominion's NPDES permit renewal application remains under review with the CTDEP. The 1992 NPDES permit and 316(b) determination remain in effect until the State acts on Dominion's NPDES permit renewal application.

4.1.1.1 Entrainment Monitoring

Entrainment of fish eggs and larvae through the Millstone cooling-water system has been monitored since 1976. During the most recent sampling periods, sampling frequency for eggs and larvae varied seasonally according to ichthyoplankton abundance, with day and night samples collected twice a week from June through August, once a week in September and February, and three times a week from March through May (Dominion 2002a; 2003a; 2004b). Only one daytime sample per week was collected during periods of low abundance (October through January). Samples were collected at the station discharges with a 1.0 × 3.6 meter (m) (3.3 × 11.8 feet [ft]) conical plankton net with 335-micrometer (μm) (0.013-inch [in.]) mesh

deployed from a gantry system into the discharge water from each unit. Four flowmeters were positioned at the mouth of the net. Sample volume was determined by taking the average reading of the four flowmeters.

Tautog and cunner were the predominant species entrained at the egg stage (Tables 4-3 and 4-5). Anchovy, winter flounder, Atlantic menhaden, American sand lance, and grubby were the predominant species entrained as larvae from 1976 through 2003 (Tables 4-3 and 4-4). Data from the most recent sampling period are shown separately in Table 4.3 to highlight substantial differences in entrainment of anchovy and Atlantic menhaden compared to the long-term average. Winter flounder was the second most common species entrained by Millstone operations from 1976 through 2003 (Table 4-3), varying from 2.9×10^7 (1977) to just under 5.0×10^8 (1992) larvae (Table 4-4). Dominion conservatively assumed 100-percent mortality for entrained organisms, which is consistent with EPA's entrainment mortality assumption (EPA 2004a).

Population abundances of important species subject to entrainment at Millstone (Section 2.2.5.5) were compared to regional trends to determine if entrainment mortality was significantly impacting local or regional populations. For anchovy, Atlantic menhaden, and American lobster, population trends observed near the plant were similar to regional trends. For American sand lance, cunner, and tautog, population abundances at Millstone varied without trend, and no apparent relationship existed between abundances observed at Millstone and regional trends. Regional data were not available for grubby, but the population has varied without trend in the vicinity of Millstone. For most species, distribution and spawning occurred throughout the region and was not confined to Millstone or other specific locations in Long Island Sound. Two species, cunner and tautog, appear to maintain relatively small home ranges, and there is evidence to suggest that tautog exhibit some degree of spawning site fidelity. Both species have exhibited apparent declines in regional populations, but abundance estimates near the plant appear to vary without trend. Winter flounder populations in the vicinity of the plant also reflected regional abundance trends. However, winter flounder differ from other important species, in that winter flounder exhibits natal stream fidelity. Localized impacts to this species during spawning and larval growth could dramatically influence local population dynamics.

Since the 1970s, Dominion has examined many aspects of winter flounder population abundance and biology, attempted to determine the direct impacts associated with plant operations, and compared the plant-related impacts to other adverse impacts on the species (Dominion 2002a; 2003a; 2004b). In addition to sampling larvae at the plant discharges, Dominion has conducted extensive surveys of adult, juvenile, and larval winter flounder abundance in the Niantic River and in areas near the Millstone site. Dominion's winter flounder monitoring program has identified a steady decline in adult winter flounder in the Niantic River

since approximately 1982 (Dominion 2004b), but noted in the ER (Dominion 2004a) that this trend has also been observed in Long Island Sound in areas beyond the influence of Millstone operations.

Table 4-3. Percent Composition of Fish Larvae Collected at the Millstone Discharges from June 1976 through May 2002 and Fish Eggs from 1979 Through 2001 (April Through September Inclusive) Compared to the Percent Composition of Fish Larvae Taken During June 2002 Through May 2003 and Fish Eggs During April Through September 2002[a]

Scientific Name	Common Name	1976 to 2002 larvae (%)	2002 to 2003 larvae (%)	1979 to 2001 eggs (%)[b]	2002 eggs (%)[b]
Anchoa spp.	anchovy	44.5	1.5	4.7	<0.1
Pseudopleuronectes americanus	winter flounder	14.2	10.8	-	-
Brevoortia tyrannus	Atlantic menhaden	10.3	74.8	-	-
Ammodytes americanus	American sand lance	7.0	0.8	-	-
Myoxocephalus aenaeus	grubby	5.7	3.9	-	-
Pholis gunnellus	rock gunnel	2.7	1.7	-	-
Tautoga onitis	tautog	2.4	1.8	27.8	24.8
Tautogolabrus adspersus	cunner	2.4	0.3	53.7	52.3
Enchelyopus cimbrius	fourbeard rockling	1.5	0.2	-	-
Liparis spp.	snailfish	1.1	0.1	-	-
Ulvaria subbifurcata	radiated shanny	1.1	<0.1	-	-
Clupea harengus	Atlantic herring	1.0	1.0	-	-
Syngnathus fuscus	northern pipefish	0.9	0.2	-	-
Scophthalmus aquosus	windowpane	0.7	0.2	-	-
Peprilus triacanthus	butterfish	0.7	0.1	-	-
Gobiidae	goby	0.7	0.6	-	-
—	Other/not identified	3.1	2.0	13.8	22.9

Source: Dominion 2004b
(a) data from 2002 to 2003 (larvae) and 2002 (eggs) are shown separately due to substantial differences in entrainment of anchovy and Atlantic menhaden compared to the long-term averages.
(b) eggs were only positively identified for tautog, cunner, and anchovy; all other eggs went into the other/not identified category

Table 4-4. Estimated Number of Anchovy, Winter Flounder, American Sand Lance, Grubby, Atlantic Menhaden, and American Lobster Larvae Entrained Each Year from 1976 Through 2003 at Millstone and the Volume of Cooling Water on Which the Entrainment Estimates Were Based

	Anchovy		Winter flounder		American sand lance[a]		Grubby		Atlantic menhaden		American Lobster	
Year	No. Entrained ($\times 10^6$)	Sample Volume[b] ($m^3 \times 10^6$)	No. Entrained ($\times 10^6$)	Sample Volume ($m^3 \times 10^6$)	No. Entrained ($\times 10^6$)	Sample Volume ($m^3 \times 10^6$)	No. Entrained ($\times 10^6$)	Sample Volume ($m^3 \times 10^6$)	No. Entrained ($\times 10^6$)	Sample Volume ($m^3 \times 10^6$)	No. Entrained ($\times 10^6$)	Sample Volume ($m^3 \times 10^6$)
1976	381	738	121	629	-	-	-	-	3	796	-	-
1977	418	821	29	444	81	954	30	489	2	773	-	-
1978	165	912	80	390	176	709	11	554	3	621	-	-
1979	805	786	44	343	110	919	20	546	<1	716	-	-
1980	877	633	168	562	111	960	32	699	2	643	-	-
1981	1452	860	45	373	74	620	42	408	2	711	-	-
1982	451	635	164	638	27	932	48	648	14	743	-	-
1983	623	691	211	541	30	902	54	628	19	564	-	-
1984	169	801	84	508	18	835	38	524	4	557	0.074	182
1985	693	697	80	469	8	712	35	527	44	521	0.123	245
1986	1096	1208	123	1064	4	1577	53	844	5	1217	0.548	640
1987	119	1332	165	1193	30	1712	51	1144	2	893	0.384	407
1988	386	1790	184	1173	74	1291	112	1132	6	791	0.577	804
1989	518	1445	167	889	42	1511	67	857	208	1420	0.379	540
1990	981	1483	133	1174	39	1607	47	998	33	1367	0.559	748
1991	451	899	116	750	7	1278	31	760	56	802	0.284	542
1992	157	1091	492	1076	19	1302	76	1293	51	1220	0.6	450
1993	214	1221	42	1387	46	1801	51	1157	21	1126	0.374	346
1994	507	1033	173	920	58	899	58	843	66	868	0.065	715
1995	171	896	214	1006	90	1532	57	996	86	997	0.659	476
1996	24	138	51	472	18	729	41	467	23	92	0.019	53
1997	17	145	76	173	3	212	28	154	5	135	0.001	52
1998	64	480	84	358	11	440	22	300	33	615	0.125	245
1999	157	1119	146	748	14	860	49	620	124	1377	0.595	238
2000	75	875	333	1003	88	1459	47	754	466	1571	0.327	452
2001	26	1031	377	963	13	1008	178	721	143	908	0.181	605
2002	28	881	119	880	6	760	33	875	1454	1088	0.243	403
2003	-		434	1096	19	725	153	890	-	-	0.115	490

Source: Dominion 2004b
(a) Annual reporting year begins on December 1.
(B) Volume was determined from the condenser and service cooling-water flows at Millstone during the season of occurrence for each taxon.

Table 4-5. Estimated Number of Cunner, Tautog, and Anchovy Eggs Entrained Each Year from 1979 Through 2001 at Millstone and the Volume of Cooling Water on Which the Entrainment Estimates Were Based

	Cunner		Tautog		Anchovy	
Year	No. entrained ($\times 10^6$)	Sample Volume ($m^3 \times 10^6$)[a]	No. entrained ($\times 10^6$)	Sample Volume ($m^3 \times 10^6$)[a]	No. entrained ($\times 10^6$)	Sample Volume ($m^3 \times 10^6$)[a]
1979	1055	423	445	680	323	383
1980	1640	677	962	773	87	359
1981	1535	620	1353	620	285	583
1982	2074	755	1248	719	210	501
1983	1888	462	1019	627	411	377
1984	2089	532	1302	569	883	453
1985	2809	737	1717	774	26	441
1986	2855	1795	3747	1795	523	772
1987	4082	1713	3575	1713	31	740
1988	4294	1800	2693	1800	15	905
1989	4306	1436	3001	1510	5	632
1990	3634	1689	2100	1641	27	724
1991	4116	1223	1513	1214	105	538
1992	2648	1509	1341	1509	18	648
1993	5379	1492	2048	1492	225	626
1994	6099	1381	1989	1381	175	867
1995	5524	1198	2481	1198	29	737
1996	871	256	312	256	4	114
1997	569	185	105	134	<1	92
1998	577	718	494	709	47	376
1999	1963	1222	1173	1222	1	339
2000	4800	1254	2149	1369	<1	849
2001	4339	1416	3015	1416	8	635
2002	3340	1188	2040	1188	<1	750

Source: Dominion 2004b

(a) Volume was determined from the condenser cooling-water flow at Millstone during the season of occurrence for each taxon.

Dominion used mathematical models to place the Millstone entrainment monitoring data in the context of total Niantic River winter flounder larval production and population trends. Dominion developed a mass-balance model to estimate the fraction of Niantic River winter flounder production entrained annually by Millstone operations. The mass-balance model's results were used as inputs to a stochastic population dynamics model, which was used to examine long-term impacts of Millstone operation on the Niantic River winter flounder stock. The model was run under several scenarios that varied fishing rate (no fishing or current fishing rate) and entrainment levels (none, low, medium, and high). The predicted biomass in 2025 was about 58,000 kilograms (kg) (128,000 pounds [lb]) under the scenario of no fishing and no entrainment. When fishing pressure was added (no entrainment), the predicted biomass dropped to 4900 kg (10,800 lb), which represents a reduction of 92 percent of the biomass under the no fishing / no entrainment scenario. When entrainment was added with fishing pressure, the predicted biomass in the year 2025 was reduced to 2800, 2300, and 1050 kg (6170, 5070, and 2310 lb) under low, medium, and high entrainment scenarios. This represents a 43 to 79 percent reduction in biomass compared to the fishing / no entrainment scenario. The modeling did not include an entrainment / no fishing scenario.

Dominion (2004b) estimated that Niantic River winter flounder entrainment ranged from 3.8 to 53 percent of larval production over the past 20 years of monitoring. Similarly, Dominion estimated that entrainment averaged 35 percent of winter flounder larval production between 1999 and 2003, with a range of 17.8 to 53 percent. Dominion (2004b) stated that the higher estimated entrainment of 53 percent in 2003 is unreliable due to the lack of an estimate of natural larval mortality. Because natural mortality for winter flounder larvae affects population independently of Millstone operations, it is an important input in the mass-balance model.

To validate the Niantic River winter flounder larvae entrainment estimates from the mass-balance model, Dominion retained Dr. Joseph Crivello of the University of Connecticut to determine, through a different analytical method, the likely source populations (Niantic, Thames, and Connecticut rivers) of winter flounder larvae entrained at Millstone (Crivello 2003). Dominion then compared its model estimates to those derived by Crivello (2003), who used genetic identification techniques for two sample periods. During 2001, the mass-balance model predicted 19.7 percent entrainment of Niantic River winter flounder larvae; Crivello (2003) predicted 21.9 percent. In 2002, the model predicted 13.8 percent entrainment compared to Crivello's prediction of 12.3 percent. The close agreement of these independent estimates derived from different analyses suggests that, at least for the years examined, the mass-balance model entrainment estimates were valid.

The percentage of water entrained by Millstone operations also supports the validity of the mass-model estimates of the fraction of Niantic River winter flounder production entrained annually by Millstone operations. Millstone Units 2 and 3 have rated circulating water flows of 34.6 m^3/s (1220 ft^3/s) and 56.6 m^3/s (2000 ft^3/s), respectively, but cooling-water use is determined by plant operating conditions or the need to take units off line for scheduled or

unscheduled maintenance. According to Dominion (2004a), the mean tidal flow in Twotree Channel is approximately 3400 cubic meters per second (m^3/s) (120,000 cubic feet per second [ft^3/s]). Tidal flow in Niantic Bay is estimated to be 2830 m^3/s (100,000 ft^3/s). The percent of Twotree Channel and Niantic Bay tidal flows entrained by Millstone operations ranged from 1 to 4 percent, with the lowest water entrainment (less than 2 percent) associated with extended plant shutdowns in 1996 to 1999. Dominion (2004a) estimates that the fraction of Niantic River flow withdrawn by Millstone is approximately 15 percent.

Dominion (2004b) interprets the relatively consistent larval abundance (based on monitoring and the mass-balance model) versus the trend of lower juvenile abundance as an indication that recruitment failure is probably related to high mortality associated with factors other than entrainment. Dominion (2004b) suggests that a "bottleneck" in the ecosystem is preventing nonentrained, late-stage larvae and subsequent juveniles from reaching reproductive maturity. This bottleneck may be attributable to the presence of predators at critical stages of winter flounder development, the impact of water temperature, the presence of aqueous constituents (anthropogenic or natural) that exert acute or sublethal toxic impacts, or other unknown factors.

Dominion (2004b) provided two additional theories to support the hypothesis that entrainment is not the primary cause of winter flounder decline. First, the extended shutdowns of Units 2 and 3 during 1997 to 1999 did not result in markedly stronger year classes or enhanced recruitment of adult winter flounder associated with the Niantic River. Second, regional winter flounder populations are declining.

Dominion suggests that a compensatory mechanism is responsible for the high observed larval entrainment in recent years despite low abundance of Niantic River winter flounder spawners. The applicant believes that the high abundance of newly hatched larvae could be due to increased egg survival from decreased predation on eggs or increased fecundity of spawner females at the lower population size. Higher abundance of later-stage larvae could be due to lower mortality at both lower population density and decreased mortality associated with warmer spring temperatures.

Dominion (2004b) suggests that there are many factors adversely influencing winter flounder, including fishing pressure, regional water temperature increases, the presence or absence of predators at critical life stages, the acute or sublethal impacts caused by the presence of natural or anthropogenic constituents, and natural population fluctuations that may independently exist. Based on its monitoring, model analyses, and the 316(b) determination in the current NPDES permit, Dominion concluded that the impacts of entrainment "do not require mitigation beyond those measures that are required by the NPDES permit, as periodically amended" (Dominion 2004a).

The CTDEP has expressed an ongoing concern with entrainment impacts associated with Millstone operations, particularly for Niantic River winter flounder. The agency is in agreement

with the applicant that multiple factors, including overfishing, environmental changes related to regional temperature increases, and entrainment impacts from Millstone operations have contributed to the decline of the Niantic River winter flounder population. The area of disagreement between the applicant and the CTDEP involves the extent to which each factor has contributed to the decline of Niantic River winter flounder. The CTDEP believes that Millstone is having a significant impact on the Niantic River winter flounder due to entrainment of winter flounder larvae. Crecco (2003) claims that although the abundance of one-year-old age class and adult (ages 4+) Niantic River winter flounder declined steadily from 1991 to 2001, similar declines have not occurred in Long Island Sound, indicating that some factor specific to the Niantic River (i.e., entrainment) has resulted in recruitment failure in the Niantic River.

The CTDEP has noted that the recent high larval entrainment estimates for Niantic River winter flounder do not reflect the marked reduction in the number of female winter flounder that spawn in the Niantic River and the correspondingly reduced estimates of Niantic River winter flounder egg production. CTDEP staff does not agree with the applicant's assertion that the apparent incongruence in entrainment estimates and population trends is due to a compensatory mechanism that results in increased survival of early life stages at low spawner abundance. A CTDEP contractor reviewed and evaluated the mass-balance model used by Dominion to estimate Niantic River winter flounder entrainment. Specifically, CTDEP staff was concerned that the high Niantic River winter flounder larval entrainment estimates were due to the violation of one or more of the model's assumptions (Greig et al. 2002).

The review concluded that the recent high-entrainment estimates for Niantic River winter flounder are the result of assessments of in-river larval abundance that are possibly inaccurate due to intrusion of non-Niantic River larvae into the river, and larval sampling in preferred spawning areas or areas where larvae are concentrated by currents (Greig et al. 2002). The study also concluded that additional overestimation of Niantic River winter flounder larval entrainment resulted from the approach used in the mass-balance model for estimating larval densities in Niantic Bay. In addition, Greig et al. (2002) examined current patterns in the Niantic Bay and suggested that assumptions in the model related to predicting entrainment based on transport of larvae through the zone of entrainment are incorrect. Based on these findings, Greig et al. (2002) questioned the utility of the mass-balance model input data for understanding the impact of entrainment on Niantic River winter flounder. Dominion responded to the report with detailed comments addressing these points and other issues raised in the review (Dominion 2002b; 2003b).

In a subsequent report written by CTDEP staff, Crecco (2003) asserts that the lack of relationship between late-stage larval and juvenile abundance indices in the river and future recruitment of Niantic River winter flounder supports the hypothesis that larval abundance indices for the Niantic River are highly biased due to the influx of non-Niantic River flounder larvae. Based on a Ricker-type stock recruitment model developed by CTDEP staff (Crecco 2003), entrainment levels for Niantic River winter flounder were estimated at 40 to

50 percent from 1977 to 1997 (compared to Millstone's estimate of 14 percent for the same time period). The licensee presented counter arguments by citing Crivello's work that relied on genetic markers to validate the origins of the larvae (Crivello 2003). Crecco (2003) further asserts that the persistently low recruitment levels during time periods in which Millstone was shut down are consistent with the presence of critical depensation, a situation in which the spawning stock size has fallen below some critical level and can no longer successfully recruit new fish to the population.

NOAA Fisheries staff concurs with the applicant and CTDEP staff that Niantic River winter flounder are being impacted by overfishing, environmental changes related to regional temperature increases, and entrainment from Millstone operations. NOAA Fisheries staff believes that significant impacts from entrainment at Millstone are likely occurring due to the high volume of cooling water entrained through the cooling system, the number of larvae entrained, and the location of plant intakes in relation to current flowing out of the Niantic River. NOAA Fisheries staff emphasized that there is considerable uncertainty surrounding winter flounder life history, which has made it difficult to evaluate how the population is being impacted by various stressors. Nevertheless, NOAA Fisheries staff does not believe that the compensatory mechanism suggested by Dominion is likely to occur in prey species such as winter flounder. In addition, based on research conducted by NOAA Fisheries scientists, there is some evidence of offshore reproduction for winter flounder, which suggests that the assumption of natal stream fidelity might not always be true.

In order to assess the impacts of entrainment associated with Dominion activities, NRC staff reviewed the applicant's ER, annual monitoring data, and pertinent peer-reviewed journal articles written or co-authored by Dominion staff. NRC staff also consulted with CTDEP and NOAA Fisheries, and interviewed Crivello at the University of Connecticut concerning the fish genetics work he had performed as a consultant to Dominion. Crivello also provided peer-reviewed journal articles summarizing his work.

NRC staff adopted a weight-of-evidence approach consistent with Menzie et al. (1996) to evaluate the information. NRC staff identified the survival and sustainability of the Niantic River winter flounder as the primary assessment endpoint (AE) of interest, with an AE defined by Menzie as an "explicit expression of the environmental value to be protected." NRC staff also identified five general categories of measurement endpoints (MEs), which Menzie defines as "lines of evidence used to evaluate the assessment endpoint." These MEs included studies of regional fish population trends (primarily as recreational or commercial catch data), local fish population assessments near the power plant, larval sampling near the power plant, genetic investigations of the origin of entrained larvae, and entrainment modeling. The identified MEs produced 10 relevant lines of evidence that addressed, to some extent, the impact of Dominion activities on winter flounder survival and sustainability. Each line of evidence was evaluated to determine its overall use and utility in supporting the primary AE, by considering 11 attributes that included the strength of association between the ME and AE, site specificity, impact

specificity, ability of the ME to judge environmental harm, temporal and spatial representativeness, and other attributes described by Menzie et al. (1996). By evaluating each line of evidence relative to the attributes, it was possible to develop a semi-quantitative assessment of the overall use and utility of each ME relative to the primary AE. NRC staff then examined the different MEs for their level of agreement with and strength of support for the different positions presented by the applicant, CTDEP, NOAA Fisheries, and independent research.

The CTDEP has based its assessment of Millstone's impacts primarily on a comparison of local (Niantic River) winter flounder trends to regional trends, with the assertion that the local decline has been more severe than the regional decline. In contrast, Dominion cites the similarity in local versus regional trends in winter flounder as evidence that Millstone is not having a significant impact on the population (Dominion 2004b). NRC staff examined various data sources (see section 2.2.5) and did not detect enough difference between trends in the local and regional abundance data to conclude with certainty that the discrepancy is significant. NRC staff noted that the apparent differences in trends shown graphically in Crivello (2003) become much less discernable when data from the same time periods are compared, particularly for adult flounder (age 4+). NOAA Fisheries has concluded that the Southern New England/Mid-Atlantic stock of winter flounder is overfished and overexploited (NOAA 1998; NOAA 2003) and has instituted measures to reduce fishing pressure throughout Long Island Sound and the Southern New England/Mid-Atlantic region. Thus, there is ample evidence to suggest that fishing pressure is directly contributing to the decline of the stock and may represent the major impact to this resource. The extent to which Dominion contributes to or exacerbates the problem in the Niantic River system is not elucidated by fish population studies reviewed in this SEIS.

Associations have also been made between the timing of Millstone operations and local trends in winter flounder. Greig et al. (2002) note that a shift occurred in the Niantic River winter flounder in or around 1991, approximately four years after the commissioning of Unit 3. The four-year time interval is relevant because it represents the lag between larval stages vulnerable to entrainment and reproductive maturity for females in a cohort. Dominion noted that Unit 3 went online in 1986, not four, but rather five years before 1991, which weakens the association somewhat. Dominion also pointed out that the fishing mortality rate increased substantially in 1983 and peaked in the early 1990s, and that spawner abundance in 1984 (two years before Unit 3 startup) was approximately half the levels seen from 1976 to 1983 (Dominion 2003b). Dominion (2001a) noted that there was no large change in the abundance of adult Niantic River winter flounder following the retirement of Unit 1 in 1995 or the larger, temporary shutdowns of Units 2 and 3 in 1996–1998. Crecco (2003) attributes the lack of positive response of the Niantic River winter flounder to reduced entrainment and reduced fishing pressure during the 1996–1998 time period as further evidence of critical depensation. As discussed earlier, Dominion attributes recruitment failure to a "bottleneck" that reduces recruitment of postentrainment early life stages. NRC staff acknowledges that both

compensatory and depensatory mechanisms are possible for the Niantic River winter flounder, but that the mechanisms are hypothesized rather than having been directly observed or measured. It also cannot be ruled out that depensatory and compensatory processes are occurring simultaneously at different life stages.

Entrainment models developed by Dominion and the CTDEP do not agree on the fraction of Niantic River winter flounder larval production that is entrained. However, the only recent entrainment estimates for Units 2 and 3 operation that are available for this review are based on the mass-balance model developed by Dominion. NRC staff reviewed the CTDEP critique of the model (Greig et al. 2002) and the subsequent response from Dominion (Dominion 2003b), and concluded that the model provided the best available estimate of entrainment, particularly considering the corroboration for two separate years provided by Crivello (2003). Although NRC staff acknowledges that CTDEP staff finds the high entrainment estimates produced by the model to be implausible given low spawner abundance, NRC staff has not found sufficient evidence in this review to warrant eliminating from consideration the information provided by the model. NRC staff notes further that the mass-balance model is conservative in that it tends to overestimate larval entrainment.

The stochastic population dynamics model used by Dominion to predict Niantic River winter flounder biomass under various scenarios suggests that fishing has a much greater impact on the population than entrainment. However, the value chosen for the medium entrainment scenario (14.2 percent) was derived by averaging annual estimates of entrainment since 1986 (excluding 1996 to 1998 due to extended shut-down periods and 2000 due to incomplete data). NRC staff has noted that the average annual entrainment estimate for recent years under Units 2 and 3 operation (1999 to 2003, excluding 2000) was 30.6 percent, compared to 14.2 percent for earlier years under three-unit operation (1986 to 1995). Although increasing the input values for entrainment would increase the predicted impact from entrainment, the magnitude of the increase is unknown. Further, NRC staff notes that the modeling did not include a scenario of entrainment without fishing pressure.

4.1.1.2 Assessment of Impact

The staff's evaluation of past impacts of entrainment on Niantic River winter flounder is inconclusive because unresolved questions remain about population dynamics, life history, and unknown factors that may be impacting the population. The available data do not allow the staff to unequivocally link or decouple population declines with Millstone operations. A better understanding of environmental factors that seem to be affecting the mortality rates for late-stage larvae is needed. Until spawning success can be correlated with particular year classes, assignment of impact to various contributors is speculative.

The staff concludes that the impact of entrainment on species other than winter flounder is not detectable. Abundance trends for most important fish and shellfish species (anchovy, Atlantic

menhaden, American lobster, American sand lance, cunner, and tautog) were similar between the Millstone area and the region. Regional abundance data were not available for grubby, but the local abundance did not show a decline. Cunner and tautog have exhibited apparent declines in regional abundance, but abundance estimates near the plant appear to vary without trend. Regardless of cause, the Niantic River winter flounder spawning population appears to have reached critically low levels and to be highly vulnerable to collapse. Poor recruitment success due to unknown causes is a contributing factor in the decline, but there is large uncertainty regarding the extent of the impact from Millstone operations. Because the spawning adult population is very low, and in consideration of the 20-year license renewal period, the staff's conclusion is that the impacts of entrainment would be MODERATE.

During the course of the SEIS preparation, the staff considered mitigation measures for the continued operation of Millstone, Units 2 and 3. Dominion and CTDEP are discussing mitigation measures as part of the NPDES permit renewal application. Mitigation options being discussed include the following: reducing intake flow during the winter flounder spawning season; performing regular inspection, maintenance, and refueling during the spawning season; importing fish into the Niantic Bay; installing fine mesh screens at the intake structures; and installing cooling towers. CTDEP is responsible for the review and issuance of NPDES permits in Connecticut and also responsible for implementation of the CWA in Connecticut. The NRC does not have authority over matters concerning discharge permits or compliance with the CWA. The NRC, however, recommends that before any significant mitigation is implemented at Millstone to lessen the impact on winter flounder, a thorough understanding of the causes for the unusually poor recruitment of juveniles is necessary. This understanding can only be obtained through the implementation of a detailed study to determine the reasons behind the "bottleneck" or significant loss of early post-entrainment life stages from causes other than entrainment by Millstone. Until fishery resource managers are able to correlate spawning success with recruitment, any mitigation may not result in any improvement in the Niantic River winter flounder population size. The staff expects that any measures identified in the NPDES permitting process will provide mitigation for impacts related to entrainment. Any mitigation measures imposed by the state of Connecticut as a result of the ongoing NPDES permit review would be expected to reduce entrainment losses to winter flounder and lessen the impact of plant operations on the Niantic River winter flounder.

4.1.2 Impingement of Fish and Shellfish

For power plants with once-through heat-dissipation systems, impingement of fish and shellfish on debris screens of cooling-water systems associated with nuclear power plants is considered a Category 2 issue, requiring a site-specific assessment before license renewal. The staff visited the site, consulted with regulatory agencies, and independently reviewed the applicant's ER, NPDES permit, and impingement studies submitted to the CTDEP.

Section 316(b) of the CWA requires that the location, design, construction, and capacity of cooling-water intake structures reflect the best technology available for minimizing adverse environmental impacts. Impingement of fish and shellfish on the debris screens of the cooling-water intake system is a potential adverse environmental impact that can be minimized by use of the best available technology.

On July 9, 2004, EPA published a final rule in the Federal Register (69 FR 41575) addressing cooling-water intake structures at existing power plants whose flow levels exceed a minimum threshold value of 189 million L/d (50 million gpd) (EPA 2004b). The rule is Phase II in EPA's development of 316(b) regulations that establish national requirements applicable to the location, design, construction, and capacity of cooling-water intake structures at existing facilities that exceed the threshold value for water withdrawals. The EPA requirements, which are implemented through NPDES permits, are designed to minimize the adverse environmental impacts associated with the continued use of the intake systems. Licensees will be required to demonstrate compliance with the Phase II performance standards in accordance with the provisions of the new rule. Licensees may be required to alter the intake structure, redesign the cooling system, modify station operation, or take other mitigative measures as part of the NPDES permit renewal process. The new performance standards are designed to reduce impingement losses due to plant operation. Any required site-specific mitigation measures would be expected to result in less impact from impingement during the license renewal period.

As described by Dominion, routine impingement monitoring for Unit 2 began in 1975 at start-up and continued until 1987 (Dominion 2002a). Routine impingement monitoring has never been conducted for Unit 3 because that unit included a fish return system in its original design. Although Unit 1 has been permanently shut down and is not being considered in the current application for relicensing, monitoring reports from 1976 to 1983 present combined impingement data from Units 1 and 2. For that reason, Unit 1 data are included here for those years. For the purpose of identifying the most commonly impinged species, the staff assumed that the proportional representation of taxa impinged was similar between the two units.

Impingement survival is the most relevant issue for recent and future operations, since fish return systems are currently in place for Units 2 and 3. Below is a discussion of the effectiveness of Units 2 and 3 fish return systems and impingement mortality.

4.1.2.1 Impingement Monitoring

For Unit 2 routine impingement monitoring, from 1975 to 1977, all impinged organisms (fish and invertebrates) were collected, identified, and counted daily over a 24-hour period. In 1977, the collection frequency was reduced to three 24-hour samples per week. Monthly impingement rates were estimated using sample count data and actual water volumes entrained at Millstone. Impingement estimates for days not sampled were calculated by multiplying the average impingement density (number per unit volume of cooling water used on days sampled) by the

volume of cooling water impinged. The actual and estimated daily counts were used to estimate monthly and annual impingement. Beginning in 1984, the sampling effort was stratified to increase the precision of the estimates for periods of high impingement for winter flounder and other fishes that are prevalent in samples during late winter. Under this stratified sampling plan, the sampling effort was reduced to once weekly from April to November, then increased from December to March, peaking at four times per week in February.

Impingement rates at Unit 2 decreased significantly following the 1983 removal of a cofferdam that was in place during the construction of the Unit 3 cooling-water intake structure. Having documented this decrease in impingement for several years, NUSCO requested relief from routine impingement monitoring for Unit 2 from the CTDEP (NUSCO 1987a) and received concurrence that further quantification was unnecessary, with the exception of any impingement events where the daily total exceeded 300 organisms. Routine impingement monitoring for Unit 2 ceased in December 1987.

The taxa that were most numerous in Millstone's impingement samples from 1976 to 1987 included winter flounder, anchovy (primarily bay anchovy), grubby, silverside (primarily Atlantic silverside [*Menidia menidia*]), Atlantic tomcod (*Microgadus tomcod*), threespine stickleback (*Gasterosteus aculeatus*), and blackspotted stickleback (*Gasterosteus wheatlandi*) (Table 4-6).

Estimates for American sand lance were skewed due to the impingement of approximately 480,000 American sand lance during the week of July 18, 1984. This represents approximately 98 percent of the total impingement for this species. Excluding the major impingement event, American sand lance impingement averaged about 600 individuals annually. Because of the extraordinary nature of that event and the otherwise relatively low impingement numbers, American sand lance was not considered to be among the most commonly impinged species. The six invertebrate taxa that were most abundant in impingement samples included Atlantic long-finned squid *(Loligo pealei)*, lady crab (*Ovalipes ocellatus*), rock crab (*Cancer irroratus*), green crab (*Carcinus maenas*), blue crab (*Callinectes sapidus*), and American lobster (*Homarus americanus*).

In 1991, NUSCO submitted an evaluation of winter flounder impingement to the CTDEP at that agency's request (NUSCO 1991). Because routine impingement monitoring for Unit 2 ceased in 1987, 1988 to 1990 estimates for Unit 2 were developed using a regression model that predicted impingement based on the catch of winter flounder at the Niantic Bay trawl station. Annual Unit 3 impingement was predicted by multiplying Unit 2 estimates by 1.74. This multiplier was based on a 1987 comparative impingement study for Units 2 and 3, which established the ratio of winter flounder impingement for Units 2 and 3 (NUSCO 1991). Results of this study are presented in Table 4-7.

Table 4-6. Total and Range of Total Annual Impingement Estimates of Fishes and Macroinvertebrates at Millstone from 1976 Through 1987 (Units 1 and 2 Combined for 1976 to 1983 and Unit 2 Alone for 1984 to 1987)

Scientific Name	Common Name	Smallest Annual Estimates	Largest Annual Estimates	Estimated Total (1976–87)	Percent of Total[a]
			MACROINVERTEBRATES		
Loligo pealei	Atlantic long-finned squid	1491	24,109	142,495	37.5
Ovalipes ocellatus	lady crab	1343	31,952	120,460	31.7
Cancer irroratus	rock crab	633	7925	44,456	11.7
Carcinus maenas	green crab	656	6687	29,950	7.9
Callinectes sapidus	blue crab	437	1963	14,317	3.8
Homarus americanus	American lobster	501	1967	11,900	3.1
Libinia spp.	spider crabs	119	1598	8517	2.2
	Top seven taxa	8866	66,196	372,095	98.0
	Others	126	1721	7520	2.0
	Total	9946	67,290	379,615	
			FISHES		
Ammodytes americanus	American sand lance	8	485,411	487,089[a]	46.9 (1.3)
Pseudopleuronectes americanus	winter flounder	624	23,544	88,665	8.5 (15.9)
Anchoa spp.	anchovy	12	52,280	82,567	8.0 (14.8)
Myoxocephalus aenaeus	grubby	647	14,634	61,984	6.0 (11.1)
Menidia spp.	silverside	136	12,187	56,368	5.4 (10.1)
Microgadus tomcod	Atlantic tomcod	8	11,868	34,728	3.3 (6.2)
Gasterosteus spp.	sticklebacks[b]	0	9918	30,656	2.9 (5.5)
Gasterosteus aculeatus	threespine stickleback[b]	0	9472	22,640	2.1 (4.1)
Gasterosteus wheatlandi	blackspotted stickleback[b]	0	14,381	20,719	2.0 (3.7)
Tautogolabrus adspersus	cunner	57	3851	20,131	1.9 (3.6)
Syngnathus fuscus	northern pipefish	384	6572	17,478	1.7 (3.1)

Table 4-6. (contd)

Scientific Name	Common Name	Smallest Annual Estimates	Largest Annual Estimates	Estimated Total (1976–87)	Percent of Total[a]
			Fishes		
Peprilus triacanthus	butterfish	135	4061	17,415	1.7 (3.1)
Urophycis spp.	hake	41	9419	15,944	1.5 (2.9)
	Top thirteen taxa	6404	506,492	956,384	92.1 (85.3)
	Others	2039	20,992	82,086	2.0 (14.7)
	Total	8560	511,387	1,038,470	

Source: Adapted from Jacobson et al. 1998
(a) Number in parentheses represents the percent of total excluding the 1984 American sand lance impingement event. Approximately 480,000 American sand lance were estimated to have been impinged during the week of July 18, 1984 (98% of total sand lance impingement). The event did not impact the percent of total values for macroinvertebrates.
(b) Threespine *(Gasterosteus aculeatus)* and blackspotted *(G. wheatlandi)* sticklebacks were not identified as separate until 1981.

4.1.2.2 Impingement Mortality

A fish return sluiceway was completed at Unit 2 in 2000. Dominion (2001b) reported on a one-year study of impingement survival for Unit 2. A similar one-year study of impingement survival for Unit 3 was conducted in 1993 (NUSCO 1994) after several improvements had been made to the original fish return system design to comply with CTDEP requirements of at least a 70-percent rate of return sluiceway efficiency. These studies showed high survival for crustaceans (76 to 93 percent) in all water temperatures and for demersal fishes (74 to 88 percent) in cool and cold water periods (Table 4-8). Pelagic fish, such as Atlantic menhaden and butterfish, and Atlantic long-finned squid had relatively poor survival

Table 4-7. Estimated Annual Impingement and Impingement Mortality of Winter Flounder at Millstone, Units 2 and 3 from 1986 to 1990

Year	Estimated Impingement at Unit 2 (100% mortality)	Estimated Impingement at Unit 3	Survival due to Unit 3 Sluiceway	Impingement Mortality at Unit 3	Total Impingement Mortality
1986	1108	1928	590	1338	2446
1987	634	1103	335	768	1402
1988	800	1392	546	846	1646
1999	907	1578	1056	522	1429
1990	524	912	108	804	1328

Source: Adapted from NUSCO 1991

(0 to 14 percent). Pelagic fish were the most impinged species group with about 1300 fish impinged over one year compared to less than 400 for any other group.

Table 4-8. Survival of Organisms Collected at the Millstone, Units 2 and 3 Aquatic Returns Based on Body Type and Water Temperature (Data for Unit 2 Collected Biweekly from July 2000 to June 2001; Data for Unit 3 Collected Biweekly from January to December 1993)

Category	Temperature Category[a]	Total Impinged		Percent Survival			
				Initial		72-h	
		Unit 2	Unit 3	Unit 2	Unit 3	Unit 2	Unit 3
Crustacean	cold	9	29	78	96	78	90
	cool	20	74	90	97	85	93
	warm	63	102	86	100	76	84
Demersal	cold	140	127	94	94	86	88
	cool	66	33	91	94	74	88
	warm	26	9	54	78	27	67
Pelagic	cold	14	140	64	61	14	0
	cool	289	23	40	13	1	0
	warm	799	45	4	4	0.5	0
Squid	cool	45	82	64	56	33	7
	warm	44	60	4	22	0	5

Source: adapted from NUSCO 1994 and Dominion 2001b

(a) Water temperatures ranged from 3.5 °C to 7.0 °C (38.3 °F to 44.6 °F) (cold), 8.0 °C to 15 °C (46.4 °F to 59.0 °F) (cool) and 16 °C to 22 °C (60.8 °F to 71.6 °F) (warm).

Table 4-9 shows the survival rate for significant species in the Millstone vicinity. Survival rates for winter flounder and American lobster were at or near 100 percent, but were somewhat lower for other demersal species. Survival rates were poor for the pelagic species (bay anchovy, Atlantic menhaden, and silversides).

4.1.2.3 Assessment of Impact

Bay anchovy abundance in the vicinity of Millstone reached its highest level in 1981, dropped dramatically between 1981 and 1982, and has gradually decreased since that time. Due to lack of quantitative data for Long Island Sound or the mid-Atlantic region, it is not possible to evaluate whether the decrease in anchovy abundance near Millstone reflects regional population trends, although Dominion (2004b) reported that sharp drops in abundance have also occurred in the past decade in Narragansett Bay and in Chesapeake Bay. Dominion (2004b) describes bay anchovy as genetically homogeneous due to high levels of stock mixing and considerable movement. The species reaches maturity at approximately three months, spawns repeatedly during the summer, and has a high natural mortality rate.

Table 4-9. Impingement Survival of Significant Species Collected at the Millstone Units 2 and 3 Aquatic Returns (Data for Unit 2 Collected Biweekly from July 2000 to June 2001; Data for Unit 3 Collected Biweekly from January to December 1993)

Scientific Name	Common Name	Category[a]	Total Impinged		Percent Survival			
					Initial		72 hr	
			Unit 2	Unit 3	Unit 2	Unit 3	Unit 2	Unit 3
Pseudopleuronectes americanus	winter flounder	D	16	43	100	97	100	94
Homarus americanus	American lobster	C	10	26	100	100	100	100
Anchoa mitchilli	bay anchovy	P	5	15	0	0	0	0
Brevoortia tyrannus	Atlantic menhaden	P	915	16	14	50	0.3	0
Menidia menidia	silversides	P	13	160	70	63	23	0
Myoxocephalus aenaeus	grubby	D	49	42	94	100	78	86
Tautogolabrus adspersus	cunner	D	32	3	69	67	56	67
Tautoga onitis	tautog	D	16	8	94	100	69	87

Source: adapted from NUSCO 1994 and Dominion 2001b
(a) D = demersal; C = crustacean; P = pelagic.

Atlantic menhaden support the largest commercial fishery along the Atlantic coast (Dominion 2004b). The status of the Atlantic menhaden fishery is considered to be healthy, and abundance estimates in the Millstone vicinity suggest an overall increase in larval population size from 1987 until the present (Dominion 2004b). Silverside population abundance in the Millstone vicinity has varied from year to year without apparent trend. Due to lack of regional abundance data, it is not possible to compare the population trends in the Millstone area to the region. Cunner sampling near Millstone has shown a decline in the population since the late 1970s. This decline is similar to regional abundance estimates, which suggest that cunner stocks have also experienced a steady decline in Long Island Sound (Dominion 2004b). Tautog abundance in the Millstone vicinity has varied without trend since the 1970s. The Connecticut recreational harvest of tautog has also varied considerably since the 1970s. Annual fishing mortality rates in the 1990s of 42 percent have potentially reduced the size of the stock, and the species is considered to be overfished (Dominion 2004b).

Fish stocks that have high or moderate impingement mortality at Millstone do not appear to have declined as a result of Millstone operations. Tautog and silverside populations have varied without trend in the vicinity of the plant, while Atlantic menhaden appear to have increased. Cunner declines near Millstone are similar to regional trends, and anchovy declines also appear to be reflecting a regional decline in the stock.

The staff has reviewed the available information, including reports provided by the applicant, information provided by regulatory agencies, public comments, and other public sources. Using this information, the staff evaluated the potential impacts due to impingement of fish and shellfish by continued operation and maintenance of Millstone. It is the staff's conclusion that the potential impacts due to impingement of fish and shellfish during the renewal term would be SMALL.

During the course of the SEIS preparation, the staff considered mitigation measures to further reduce impacts to winter flounder and other aquatic organisms as part of the continued operation of Millstone Units 2 and 3. Based on impingement numbers in Table 4-6 and on survival data from Table 4-7, NRC staff does not believe that further mitigation is warranted. However, Dominion and CTDEP are discussing mitigation measures as part of the NPDES permit renewal application. CTDEP is responsible for the review and issuance of NPDES permits and the implementation of the CWA in Connecticut. Therefore, CTDEP has authority over matters concerning discharge permits or compliance with the CWA and can impose additional mitigation measures to reduce losses due to impingement. Any mitigation measures imposed by the state of Connecticut as a result of the ongoing NPDES permit review would be expected to reduce entrainment losses to winter flounder and lessen the impact of plant operations on the Niantic River winter flounder.

4.1.3 Heat Shock

For plants with once-through cooling systems, heat shock impacts are a Category 2 issue and require plant-specific evaluation before license renewal. The NRC made impacts on fish and shellfish resources resulting from heat shock a Category 2 issue because of continuing concerns about thermal discharge impacts and the possible need to modify thermal discharges in the future in response to changing environmental conditions (NRC 1996).

Information to be considered includes (1) the type of cooling system (whether once-through or cooling pond) and (2) evidence of a CWA Section 316(a) variance or equivalent State documentation. To perform this evaluation, the staff reviewed the Dominion ER (Dominion 2004a), visited the Millstone site, and reviewed the applicant's NPDES permit (CT0003263), issued on December 14, 1992, and in force until the CTDEP acts on Millstone's 1997 application for NPDES permit renewal (Dominion 2004a). The staff also independently reviewed monitoring reports for the cooling-water discharge mixing zone.

Millstone has a once-through cooling system that withdraws water from Niantic Bay for condenser cooling and discharges it into Long Island Sound. Dominion also has Section 316(a) variance for thermal effluent limits. Section 316(a) of the CWA establishes a process whereby a thermal effluent discharger can demonstrate that thermal discharge limitations are more stringent than necessary to protect a balanced indigenous population of fish and wildlife and obtain alternative facility-specific thermal discharge limits. In renewing Millstone's NPDES permit in 1992, the CTDEP determined that thermal discharges from Millstone were sufficiently protective of fish and wildlife communities of Niantic Bay and eastern Long Island Sound to allow alternative thermal effluent limitations under Section 316(a) of the CWA. The NPDES permit also requires continued monitoring of the supplying and receiving waters, including studies of intertidal and subtidal benthic communities and finfish communities and "detailed studies" of lobster and winter flounder populations.

In 1972, a fish kill of Atlantic menhaden—attributed to heat shock or gas bubble disease—occurred in the quarry (NUSCO 1972). A fish barrier was installed later that year to prevent larger fishes from entering the quarry. When the second quarry cut was opened in 1982, a similar fish barrier was installed at that opening. Both barriers were replaced in 1999 and remain in place. Temperatures within the quarry occasionally exceed the lethal threshold temperatures for some species. However, Millstone has remained in compliance with the NPDES thermal and discharge volume limits at the quarry cut.

The current NPDES permit limits the maximum temperature of the discharge points at the quarry cut to 40.6 °C (105 °F), with a maximum temperature increase of 17.8 °C (32 °F) above the intake water temperature. Under unusual conditions, the temperature at the quarry cut can exceed the intake water temperature by 24.4 °C (44 °F) for a period not exceeding 24 hours. In the event that the temperature differential exceeds 17.8°C (32 °F), the CTDEP requires notification. The average temperature of the receiving waters cannot be raised by more than 2.2 °C (4 °F), and discharge temperature cannot increase the normal temperature of the receiving water above 46.1 °C (83 °F). The boundary of the mixing zone cannot exceed a radius of 2438 m (8000 ft) from discharge outlet at the quarry cut. The maximum allowed daily flow of the discharges is 1.0×10^{10} L/d (2.7×10^{9} gpd).

Thermal impacts associated with Millstone operations have been studied since 1979 and are reported in Dominion (2004b) and NUSCO (1987b). The impacts to rocky intertidal communities are limited to approximately 150 m (492 ft) of shoreline on the east side of the discharge to Long Island Sound including Fox Island. This area has been exposed to the thermal effluent since the opening of the second quarry cut in 1983 and has developed a resilient community of seaweeds and invertebrates. The intertidal community that developed under the thermal regimes in the discharge area is characterized by the absence or abbreviated season of occurrence of cold water species (*Chondrus* spp., *Monostroma* spp., and *Dumontia contorta*), and the presence or extended season of occurrence of warm water species (*Codium fragile, Sargassum filipendula, Gracilaria tikvahiae*, and more recently,

Hypnea musciformis). Abundant growth of *Ascophyllum* spp. has also been noted during many study years and has been attributed to elevated temperatures from the Millstone discharge. However, high nodal growth of *Ascophyllum nodosum* has also occurred during growth seasons when all Millstone units were shut down. Increased growth was not evident during the first year following Unit 3 restart, or from 2001 to 2003 when Units 2 and 3 were operating. It is possible that other factors such as ambient temperature conditions, nutrients, and light might be contributing to the *Ascophyllum* growth. Temperature monitoring at eelgrass beds in the vicinity of Millstone has not shown evidence of influence from plant discharges.

An analysis of the thermal plume characteristics associated with the discharge of cooling water from Millstone was conducted by Adams (2001). The analysis described plume configurations for four tidal cycles (maximum flood, slack after flood, maximum ebb, and slack after ebb) under various operational scenarios and pump configurations. The report calculated plume parameters for three-unit operation and for the operation of only Units 2 and 3. Results indicate that, when all pumps are operating, the operation of Units 2 and 3 produces a near-field thermal plume with a slightly higher temperature but a smaller length when compared to that of three-unit operation.

Additionally, isotherm trends for the worst-case scenario (three-unit operation) are presented in Dominion 2004b and reproduced in Figure 4-1 for four tidal conditions. For all four tidal conditions, the highest temperatures were confined to the areas south and east of the quarry cut, extending from Millstone Point to Twotree Island. Maximum flood conditions shifted the isotherms slightly west; strong ebb tides shifted them east. Under three-unit operation, the 4.4 °C, 3.3 °C, and 2.2 °C (8 °F, 6 °F, and 4 °F) isotherms are generally confined to a triangular area of approximately 1200 m (4000 ft) per side defined by Millstone Point, Twotree Island, and White Point (Figure 4-1). The 0.8 °C (1.5 °F) isotherm is present in the outer reaches of Niantic Bay only under extreme tidal flood conditions and enters Jordan Cove only during maximum ebb tide events.

The staff has reviewed the available information, including that provided by the applicant, the staff's site visit, consultations with regulatory agencies, and other public sources, such as public comment on the draft SEIS. Based on a review of these data, the staff has concluded that thermal effects are generally confined to the area immediately adjacent to the quarry cut and most likely do not present a thermal barrier to migrating fish, since access to Jordan Cove and the Niantic River is not compromised. The staff evaluated the potential impacts to aquatic resources due to heat shock during continued operation. It is the staff's conclusion that the potential impacts to fish and shellfish due to heat shock during the renewal term would be SMALL.

During the course of the SEIS preparation, the staff considered mitigation measures to further reduce impacts to winter flounder and other aquatic organisms as part of the continued operation of Millstone Units 2 and 3. Based on a review of the data, the NRC staff does not

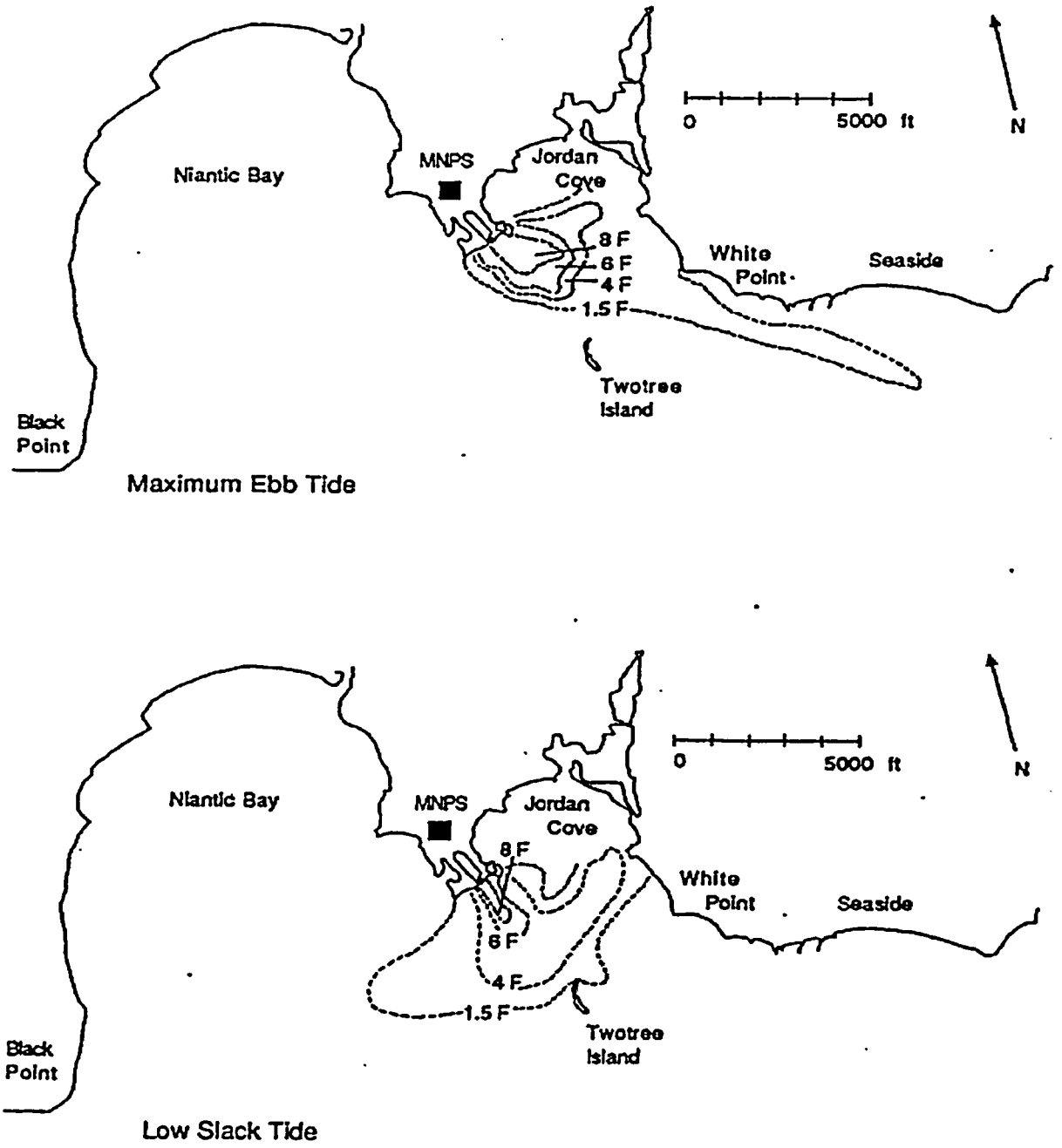

Figure 4-1. Locations of Selected Three-unit Thermal Plume Isotherms (0.8 °C, 2.2 °C, 3.3 °C, and 4.4 °C [1.5 °F, 4 °F, 6 °F, and 8 °F]) Under Various Tidal Conditions Source: Dominion 2004b.

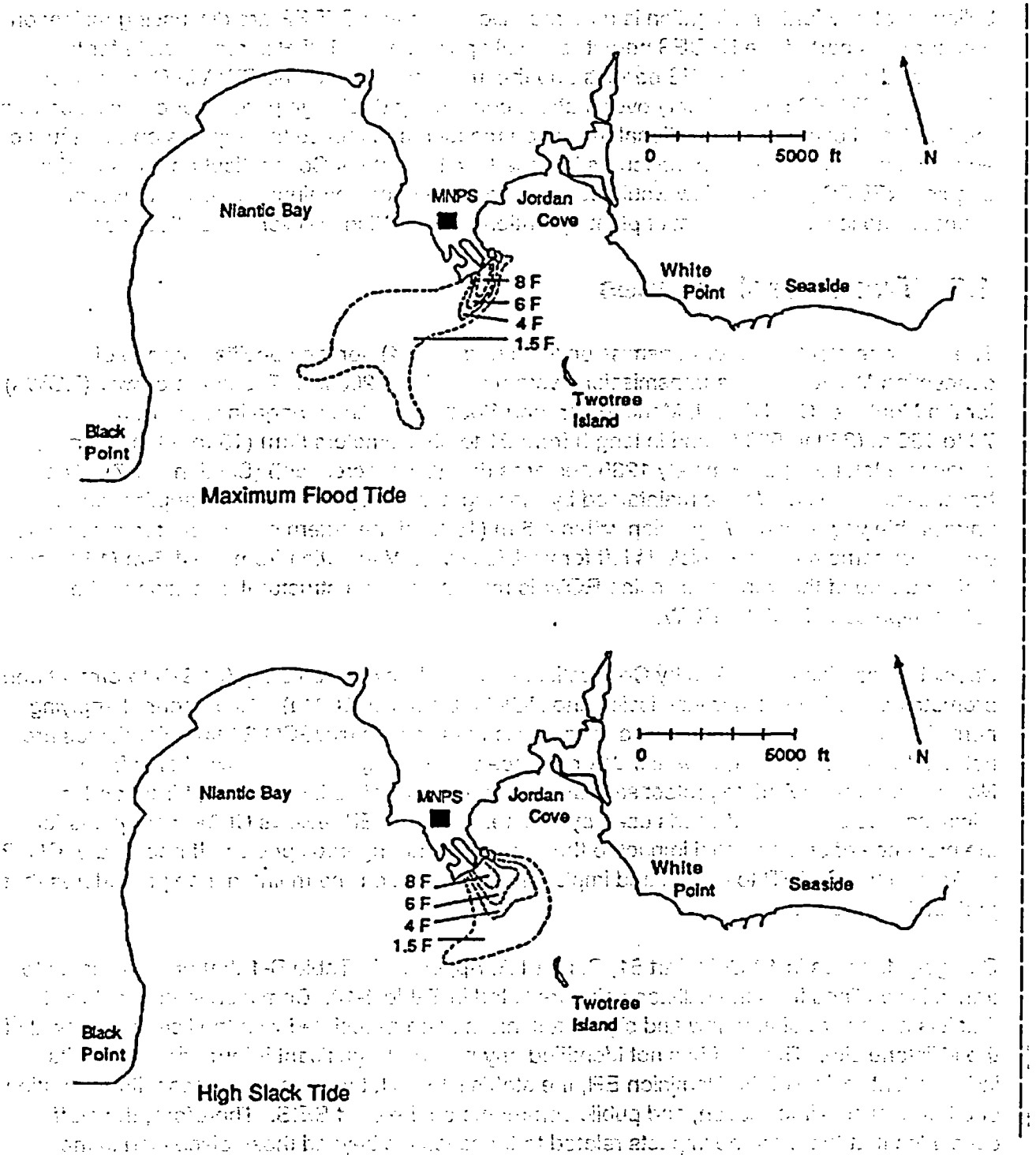

Figure 4-1. (contd)

believe that any further mitigation is required. Dominion and CTDEP are discussing mitigation measures as part of the NPDES permit renewal application. CTDEP is responsible for the review and issuance of NPDES permits and the implementation of the CWA in Connecticut. Therefore, CTDEP has authority over matters concerning discharge permits or compliance with the CWA and can impose additional mitigation measures to reduce the impacts on the aquatic environment. Any mitigation measures imposed by the state of Connecticut as a result of the ongoing NPDES permit review would be expected to reduce entrainment losses to winter flounder and lessen the impact of plant operations on the Niantic River winter flounder.

4.2 Transmission Lines

The Millstone plant has four transmission lines (Figure 2-4), for the specific purpose of connecting Millstone to the transmission system (Dominion 2004a). The rights-of-way (ROWs) for the Montville, Card Street, Manchester, and Southington lines range in width from 76 to 152 m (250 to 500 ft) and in length from 21 to 85 kilometers (km) (13 to 53 miles [mi]), covering a total of approximately 1235 hectares (ha) (3052 acres [ac]) (Section 2.1.7). The transmission line ROWs are maintained by mowing, trimming, and herbicide application to undesirable vegetation. Vegetation within 4.5 m (15 ft) of the outermost conductor is kept short except for some red cedar thickets left for wildlife cover. Vegetation from the 4.5-m (15-ft) edge to the outside of the transmission line ROW is maintained as a structural transition to the habitat type outside of the ROW.

Special precautions are taken by Connecticut Light and Power Company (CL&P) to protect and promote quality habitat in transmission line ROWs (Dominion 2004a). All personnel applying herbicides are required to possess a valid applicators license (NUSCO 2004). Herbicides are not used within 3 m (10 ft) of wetlands or surface water. Vegetation is mowed only from November through April to protect saturated soils, to avoid disturbing nesting birds, and to minimize loss of fruits and seeds used by wildlife. The CTDEP reviews CL&P work plans for the presence of and potential impact to threatened or endangered species. If necessary, CL&P works with the CTDEP to design and implement transmission line maintenance procedures that protect the species.

Category 1 issues in 10 CFR Part 51, Subpart A, Appendix B, Table B-1 that are applicable to transmission lines from the Millstone site are listed in Table 4-10. Dominion stated in its ER that it is not aware of any new and significant information associated with the license renewal of the Millstone site. The staff has not identified any new and significant information during its independent review of the Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. 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 would be SMALL, and additional plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

Table 4-10. Category 1 Issues Applicable to the Millstone Transmission Lines During the Renewal Term

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections
TERRESTRIAL RESOURCES	
Power line ROW management (cutting and herbicide application)	4.5.6.1
Bird collision 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
Flood plains and wetland on power line ROW	4.5.7
AIR QUALITY	
Air quality effects of transmission lines	4.5.2
LAND USE	
Onsite land use	4.5.3
Power line ROW	4.5.3

A brief description of the staff's review and GEIS conclusions, as codified in Table B-1, for each of these issues follows. (For each issue below, references to the Dominion ER are to Dominion 2004a.)

- Power line ROW 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 Dominion ER, the staff's site visit, the scoping process, consultation with the U.S. Fish and Wildlife Service (FWS) and the CTDEP, its evaluation of other information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from power line ROW maintenance during the renewal term beyond those discussed in the GEIS.

- Bird collision 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 Dominion ER, the staff's site visit, the scoping process, consultation with the FWS and the CTDEP, its evaluation of other information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts of electromagnetic fields on flora and fauna during the renewal term beyond those discussed in the GEIS.

- Flood plains and wetlands on power line ROW. 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 Dominion ER, the staff's site visit, the scoping process, consultation with the FWS and CTDEP, its evaluation of other information, and public comments on the draft SEIS. Therefore, the staff concludes that there are no impacts from power line ROWs on flood plains 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no onsite land use impacts during the renewal term beyond those discussed in the GEIS.

- Power line ROW. 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts of power line ROWs 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 4-11 and are discussed in Sections 4.2.1 and 4.2.2.

Table 4-11. Category 2 and Uncategorized Issues Applicable to the Millstone 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	4.2.2

4.2.1 Electromagnetic Fields—Acute Effects

In the GEIS (NRC 1996), the staff found that, without a review of the conformance of each nuclear plant transmission line with National Electrical Safety Code (NESC) criteria (NESC 1997), 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. According to the applicant:

> . . . transmission lines were designed and constructed in accordance with the National Electrical Safety Code and industry guidance that was current when the lines were built. Ongoing right-of-way surveillance and maintenance of Millstone transmission facilities ensure continued conformance to design standards. (Dominion 2004a).

In addition to compliance with the NESC limit of 5 milliampere (mA) electric-field-induced current, the transmission lines are phased to produce the lowest possible electromagnetic fields.

As described in Appendix E (Section 3.1.3) of the ER, there are four 345 kilovolt (kV) lines that were designed and constructed before the NESC promulgated the 5-mA rule on induced current. In 1987, a parking lot for the Cross Road Mall in Waterford, Connecticut was constructed under the four transmission lines.

CL&P conducted extensive studies of the electric shock potential in the parking lot and has concluded that the lines in this location are constructed in accordance with NESC provisions for limiting induced current shock, including vehicles that use this area. (Dominion 2004a).

Although Millstone has not conducted studies along the entire transmission line ROW, the Cross Road Mall is the most probable location for induced current shock.

The staff has reviewed the available information, including that provided by the applicant, the staff's site visit, the scoping process, and other public sources. Using this information, the staff evaluated the potential impacts for electric shock resulting from operation of Millstone and associated transmission lines. The staff considered the cumulative impacts of past, current, and foreseeable future actions at the site regardless of which agency (Federal or non-Federal) or person undertakes such other actions. It is the staff's conclusion that the potential impacts for electric shock during the renewal term would be SMALL.

4.2.2 Electromagnetic Fields—Chronic Effects

In the GEIS, the chronic impacts of 60-hertz (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 impacts 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. A recent 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 impacts of electromagnetic fields. The staff considers the GEIS finding of "not applicable" 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 Millstone in regard to radiological impacts are listed in Table 4-12. Dominion stated in its ER that it is not aware of any new and significant information associated with the renewal of the

Millstone OLs. The staff has not identified any new and significant information during its independent review of the Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. 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 would be SMALL, and additional plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

Table 4-12. 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. (For each issue, references to the Dominion ER are to Dominion 2004a.)

- 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other

available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts from 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.

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 4-13. Dominion has stated in its ER that it was not aware of any new and significant information associated with the renewal of the Millstone OLs (Dominion 2004a). The staff has not identified any new and significant information during its independent review of the Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there are no impacts related to these issues beyond those discussed in the GEIS (NRC 1996). For these issues, the staff concluded in the GEIS that the impacts would be SMALL, and additional plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted. Therefore, the staff concludes that there are no impacts related to these issues beyond those discussed in the GEIS (NRC 1996). For these issues, the staff concluded in the GEIS that the impacts would be SMALL, and additional plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

Table 4-13. 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. (For each issue below, references to the Dominion ER are to Dominion 2004a.)

- 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be 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 Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no aesthetic impacts of transmission lines during the renewal term beyond those discussed in the GEIS.

Table 4-14 lists the Category 2 socioeconomic issues, which require plant-specific analysis, and environmental justice, which was not addressed in the GEIS.

Table 4-14. 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
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 1996), which presents a population characterization method that is based on two factors, "sparseness" and "proximity" (GEIS Section C.1.4 [NRC 1996]). 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).

All or parts of 15 counties, the city of Hartford, and sections of the Hartford and the New London-Norwich Metropolitan Statistical Areas are located within 80 km (50 mi) of Millstone, and four states also fall within this radius. Approximately 73 percent of Millstone's employees live in New London County while another 12 percent reside in Middlesex County. Another 14 percent are distributed across 14 counties in Connecticut, Massachusetts, and Rhode Island with numbers ranging from 1 to 60 employees per county. As estimated from 2000 U.S. Census Bureau information, 2,868,207 people live within 50 miles of Millstone. This equates to a population density of 219 persons per square kilometer (km^2) (567 persons per square mile [mi^2]). Applying the GEIS proximity measures, Millstone is classified as Category 4 (greater than or equal to 190 persons per square mile within 50 miles).

According to the GEIS sparseness and proximity matrix, the Millstone ranks of sparseness, Category 4, and proximity, Category 4, result in the conclusion that Millstone is located in a high-population area.

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. Millstone is located in a high-population area of southeastern Connecticut. Dominion plans to add no more than five additional permanent employees during the license renewal term. Dominion's analysis determined that some towns are applying growth control measures designed to guide but not preclude growth. There are no growth limits in Waterford, but the town regulates residential densities within zoning districts by establishing the maximum number of units allowed for any given parcel and by considering the most appropriate development pattern. The Dominion ER (Dominion 2004a) concluded that impacts to housing availability from a plant population growth of up to five employees would be SMALL and would not warrant mitigation during continued operations based on the NRC criteria.

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 1996). 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.

The U.S. Census Bureau (USCB) reported that there were 7986 housing units in Waterford in 2000, and a total of 110,674 in New London County. The vacancy rate in Waterford was 5.6 percent (444 units) while it was 9.8 percent (10,839) in New London County (USCB 2000). According to the 1998 *Plan of Preservation, Conservation & Development*, there is the theoretical potential for about 4000 additional housing units in Waterford. The plan recommends that Waterford continue to provide for a diversity of housing types, and encourage the availability of housing for a variety of age and income groups. While housing is a regional issue of concern in southeastern Connecticut, the focus of that concern is the provision of housing for the increasing numbers of service workers associated with the casino, tourism and service sector, and the provision of appropriate housing for the increasing numbers of single occupancy and elderly households (Southeastern Connecticut Council of Governments [SCCOG] 2004).

The staff reviewed the available information relative to housing impacts and Dominion'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 would not be 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 1996).

Millstone acquires potable water from the city of New London through pipes owned by Waterford. Millstone's 2000 to 2001 potable water usage averaged 1.257×10^6 L/d (3.320×10^5 gpd). This usage represents approximately 5.2 percent of the city of New London's daily capacity and 6 percent of its average daily use. Impact on local water supplies is not expected to change during continuing operations at Millstone as a result of license renewal. Adding direct and indirect employees (as a result of five additional license renewal employees) would not significantly impact the capacity in the region's water supplies. Analysis of impacts on the public water supply system considered both plant demand and plant-related population growth. Millstone water usage is not expected to change during the license renewal period and no refurbishment activities are planned for Millstone. Average daily water withdrawals are near authorized withdrawal limits (capacities) in some areas, and, while the region overall has excess capacity, it is expected to eventually experience water shortages in some areas. Although future water shortages are a concern for the region, their occurrence would be independent of the license renewal process. Dominion concluded that impacts to the public water supply from plant-related population growth and plant demand would be SMALL and mitigation would not be warranted (Dominion 2004a). The recently approved Thames Basin Regional Water Interconnection Project will provide alternative water supply sources for Waterford by interconnecting the Norwich, Groton, and the New London / Waterford systems. This project provides a degree of redundancy to the Waterford water system while mitigating pressure deficiencies that have been a concern for fire fighting in the Quaker Hill neighborhood. Piping water from Groton will provide a less costly solution than developing new sources, while increasing the safe yield available for present and future demands (City of Waterford 2002).

The staff has reviewed the available information, including the Dominion analysis discussed above. Based on this information, the staff concludes that the potential impacts of Millstone during the license renewal period upon water use would be SMALL, and that additional mitigation would not be 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.

Dominion has identified a maximum of five additional permanent employees during the license renewal term (Dominion 2004a). Using this upper-bound employment assumption, the staff calculated that there could be an increase in total population of 15 people from continued operation of Millstone within southeastern Connecticut during the license renewal term. This represents about 0.006 percent of the current population of the area.

Section 3.7.5 of the GEIS (NRC 1996) states that if plant-related population growth is less than 5 percent of the study area's total population, offsite land-use changes would be small, especially if the study area has established patterns of residential and commercial development, a population density of at least 23 persons/km^2 (60 persons/mi^2), and at least one urban area with a population of 100,000 or more within 80 km (50 mi). Population growth related to Millstone license renewal is expected to be less than 0.006 percent of the area's 2000 total population of 2,868,207; Waterford and the southeastern Connecticut region have established patterns of residential and commercial development, a population density of 219 persons/km^2 (567 persons/mi^2), and there are two cities (Hartford and New Haven) each with a population of about 123,000 in 2000 within a 80-km (50-mi) radius. Consequently, the staff concludes that population changes resulting from license renewal would be likely to result in SMALL offsite land-use impacts.

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 jurisdiction's 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.

In 1999, prior to electric deregulation, property tax payments from Millstone accounted for 69 percent of Waterford tax revenues or $34.8 million. In 2000, after deregulation, Millstone taxes paid to Waterford represented 36 percent of the town's total annual property tax revenues or $11.7 million (Dominion 2004a). Based on an analysis by the town of Waterford (2003), tax payments from Millstone will continue to account for 25 to 30 percent of annual tax revenues.

The town of Waterford has anticipated the need to reduce its overall fiscal reliance on Millstone as a consequence of the change in assessment methodologies for electric power utilities. The *Town of Waterford Long Range Financial Management Plan* provides a toolkit with over 140 recommendations to assist the town of Waterford and the Waterford Public Schools to control and reduce costs (Waterford 2000).

The nontax economic benefits of Millstone on New London County will continue to be substantial. Millstone's impact between April 2001 and April 2002, was $515.2 million in New London County. The main expenditure by Dominion for Millstone is salaries. Direct and indirect compensation accounted for $118.3 million paid to employees residing in New London County during this period. In 2004, the average salary with benefits for a permanent employee at Millstone is $100,256, which is 50 percent higher than the average for New London County. In 2001, Dominion purchases in New London County were $34 million (Nuclear Energy Institute 2004).

The criteria in the GEIS (Section C.4.1.5.2) result in the assignment of an impact level of MODERATE when tax levels are greater than 10 percent. However, the case study assumed a certain level of refurbishment. There are no major refurbishment activities planned at Millstone to support license renewal, and no new sources of plant-related tax payments are expected that could significantly affect land use in New London County. Millstone has been and likely will continue to be an important economic force for New London County. However, Millstone has not been the primary factor in land-use change in Waterford or New London County. Waterford's slow rate of population growth (0.4 percent since 1980) is the same as New London County. There is still a large amount of land that is zoned and suitable for residential, commercial, and industrial development in Waterford. Southeastern Connecticut has been

addressing many planning issues including housing, water, transportation, and development patterns on a regional level. Land use patterns and trends are similar in Waterford and other suburban towns in southeastern Connecticut. In addition, continued operation of Millstone over the license renewal term would be important to maintaining the current level of development and public services in Waterford. Based on these considerations, it is the staff's conclusion that the tax-related land-use impacts are likely to be SMALL.

4.4.4 Public Services: Transportation Impacts During Operations

On October 4, 1999, 10 CFR 51.53(c)(3)(ii)(J) and 10 CFR Part 51, Subpart A, Appendix B, Table B-1 were revised to clearly state that "Public Services: Transportation Impacts During Operations" is a Category 2 issue (see NRC 1999 for more discussion of this clarification). The issue is treated as such in this SEIS.

There is no refurbishment planned at Millstone and, therefore, refurbishment impacts to the local transportation system are not anticipated and further evaluation is not necessary. Dominion reports that there would be no more than five additional license renewal term employees (Dominion 2004a). This is in addition to the station workforce of 1550 to 1650 employees and long-term contractors and a periodic outage workforce of as many as 800 additional workers.

Waterford, New London County, and the southeastern Connecticut region have a well-developed transportation system. In 2001, the segments of Route 156 passing by the Millstone access (at High Ridge Drive) had a volume to capacity ratio of 0.40, which means that there is unused capacity (SCCOG 2003). A new traffic signal will be installed at the intersection of Route 156 and Gardiners Wood Road, and recent changes to the intersection of Route 156 at Route 213 (Great Neck Road) should mitigate the congestion experienced there at certain times of day. The regional transportation plan for southeastern Connecticut contains a number of recommendations to address transportation concerns that could affect Waterford and Millstone because Millstone is the eleventh largest regional nonresidential traffic generator, and one of six high-security sites in southeastern Connecticut. The highest priority projects for southeastern Connecticut that affect Millstone are the completion of Route 11, and capacity improvements to Interstate 95. These projects remain unfunded (SCCOG 2003).

The staff has reviewed the Dominion ER (Dominion 2004a) and other information made available during interviews with local officials and observation of the transportation conditions around Millstone. The staff concludes that, based on the information available, increasing the current permanent workforce of Millstone during the license renewal period would result in a SMALL impact upon transportation, such that mitigation would not be warranted.

4.4.5 Historic and Archaeological Resources

The National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to take into account the impacts of their undertakings on historic properties. The historic preservation review process mandated by Section 106 of the NHPA is outlined in regulations issued by the Advisory Council on Historic Preservation at 36 CFR Part 800. Pursuant to the NHPA, the NRC is to make a reasonable effort to identify historic properties in the area of potential effects. If no historic properties are present or affected, the NRC is required to document its finding and notify the State Historic Preservation Officer before proceeding. If it is determined that historic properties are present, the NRC is required to assess and resolve possible adverse impacts of the undertaking.

On August 5, 2003, the Connecticut deputy state historic preservation officer indicated that the license renewal of Units 2 and 3 at Millstone would have "no effect" on historic properties (Connecticut Historical Commission 2004). However, earlier correspondence with the State Historic Preservation Office (Connecticut Historical Commission 2003) indicated the need to restrict activities to existing developed areas and that any new use of previously undeveloped areas within Millstone would require evaluation and new consultation. In addition, by letter dated October 6, 2004, the State Historic Preservation Office (Commission on Culture and Tourism 2004) stated, "This office expects that the proposed undertaking will have no effect on historic, architectural, or archaeological resources listed on or eligible for the National Register of Historic Places." The staff reviewed information contained in the ER prepared by Dominion (Dominion 2004a), conducted a search of archives and records stored at the Connecticut Historical Commission office in Hartford, and examined published literature about the archaeology and history of Connecticut. The staff also sent letters to the Narragansett Indian Tribe and the Mashantucket Pequot Tribal Nation inviting them to provide input to the scoping process relating to the NRC's environmental review of the applications and informing them that the NRC planned to coordinate compliance with Section 106 of the NHPA through the requirements of the National Environmental Policy Act of 1969 (NEPA), as outlined in 36 CFR 800.8. Neither the Narragansett Indian Tribe nor the Mashantucket Pequot Tribal Nation expressed concerns regarding historic, cultural, or archaeological resources.

It is unlikely that significant historic resources are present in the previously developed portions of Millstone. However, provisions for dealing with the inadvertent discovery of significant subsurface archaeological deposits and human remains are part of the administrative control procedures in place at Millstone, in the unlikely event such deposits and remains are encountered during routine operations and maintenance. As described in Chapter 3, major refurbishment of Millstone is not expected during the license renewal period, and it is anticipated that there will be no need to use the currently undeveloped portions of the Millstone site for operations during the renewal period. Millstone management is aware of the known cultural resources at Millstone and is committed to taking them into account during the license renewal period (Dominion 2004a). Continued operation of Millstone would be expected to have

a beneficial impact on these or any potential unknown or undiscovered historic or archaeological resources in undisturbed areas for the duration of the license renewal period by protecting the natural landscape and vegetation and by restricting access to the plant site.

Based on the staff's cultural resources analysis and consultation, the finding that Dominion did not identify any major refurbishment activities related to the renewal of the Millstone Units 2 and 3 OLs, and that operation will continue within the bounds of plant operations as evaluated in the Final Environmental Statement (U.S. Atomic Energy Commission 1973), it is the staff's conclusion that the potential impacts on historic and archaeological resources would be expected to be SMALL, and that mitigation is not warranted.

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 impacts 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. The Council on Environmental Quality has provided guidance for addressing environmental justice (Council on Environmental Quality 1997). Although the executive order is not mandatory for independent agencies, the NRC has voluntarily committed to undertake environmental justice reviews. On August 24, 2004, the Commission published a Final Policy Statement in the Federal Register on the treatment of environmental justice matters in NRC regulatory and licensing actions (NRC 2004d). The Final Policy Statement reaffirms that the Commission is committed to full compliance with the requirements of NEPA. Specific guidance is provided in NRC Office of Nuclear Reactor Regulation Office Instruction LIC-203, Revision 1, *Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues* (NRC 2004c).

The scope of the review as defined in NRC guidance (NRC 2004c) 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.

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

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[(a)] 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 percent, 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.

The staff examined the geographic distribution of minority and low-income populations within 80 km (50 mi) of Millstone, using information derived from the 2000 Census for minority and low-income populations (Dominion 2004a). The analysis was supplemented by field inquiries to the Town of Waterford, the SCCOG and the United Way of New London County. Figures 4-2 and 4-3 show the distribution of census block groups for the minority and low-income populations, respectively.

The area within 80-km (50-mi) of Millstone includes parts of four states. USCB data characterize Connecticut as 0.3 percent American Indian or Alaskan Native, 2.4 percent Asian, 0.0 percent Native Hawaiian or other Pacific Islander, 9.1 percent Black races, 4.3 percent all other single minorities, 2.2 percent multiracial, 18.4 percent aggregate of minority races, and 9.4 percent Hispanic ethnicity. Rhode Island is 0.5 percent American Indian or Alaskan Native, 2.3 percent Asian, 0.1 percent Native Hawaiian or other Pacific Islander, 4.5 percent Black races, 5.0 percent all other single minorities, 2.7 percent multiracial, 15.0 percent aggregate of minority races, and 8.7 percent Hispanic ethnicity. New York was characterized as 0.4 percent American Indian or Alaskan Native, 5.5 percent Asian, 0.0 percent Native Hawaiian or other Pacific Islander, 15.9 percent Black races, 7.1 percent all other single minorities, 3.1 percent multiracial, 32.1 percent aggregate of minority races, and 15.1 percent Hispanic ethnicity. Massachusetts with 0.002 percent of the block groups is characterized as 0.2 percent American Indian or Alaskan Native, 3.8 percent Asian, 0.0 percent Native Hawaiian or other Pacific Islander, 5.4 percent Black races, 3.7 percent all other single minorities, 2.3 percent multiracial, 15.5 percent aggregate of minority races, and 6.8 percent Hispanic ethnicity.

(a) 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 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 in accordance with USCB guidelines for the purpose of collecting and presenting decennial census data. Census block groups are subsets of census tracts (USCB 2001).

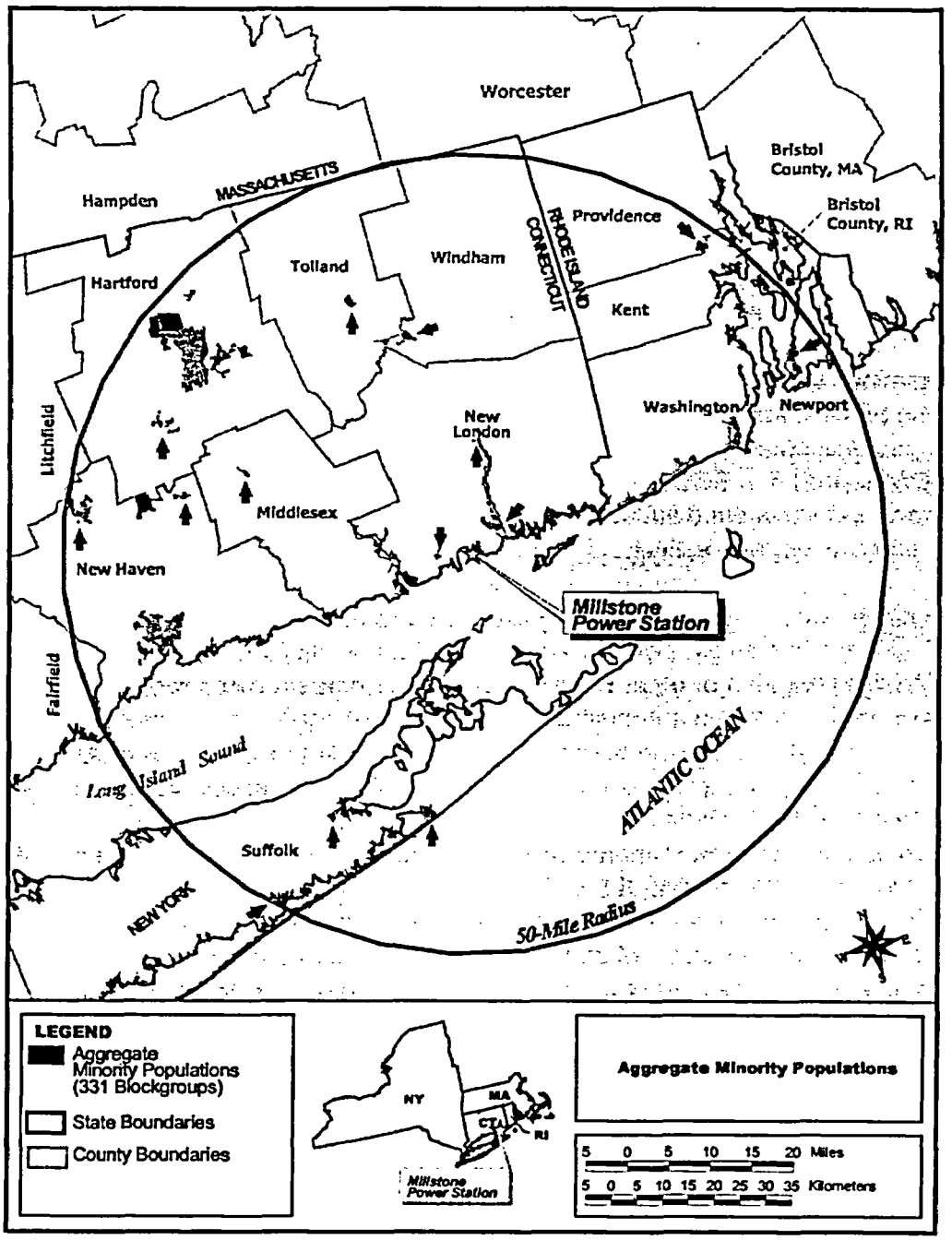

Figure 4-2. Geographic Distribution of Minority Populations (shown in shaded areas) Within 80 km (50 mi) of Millstone Based on Census Block Group Data[a]

(a) Note: Some of the census block groups extend into open water.

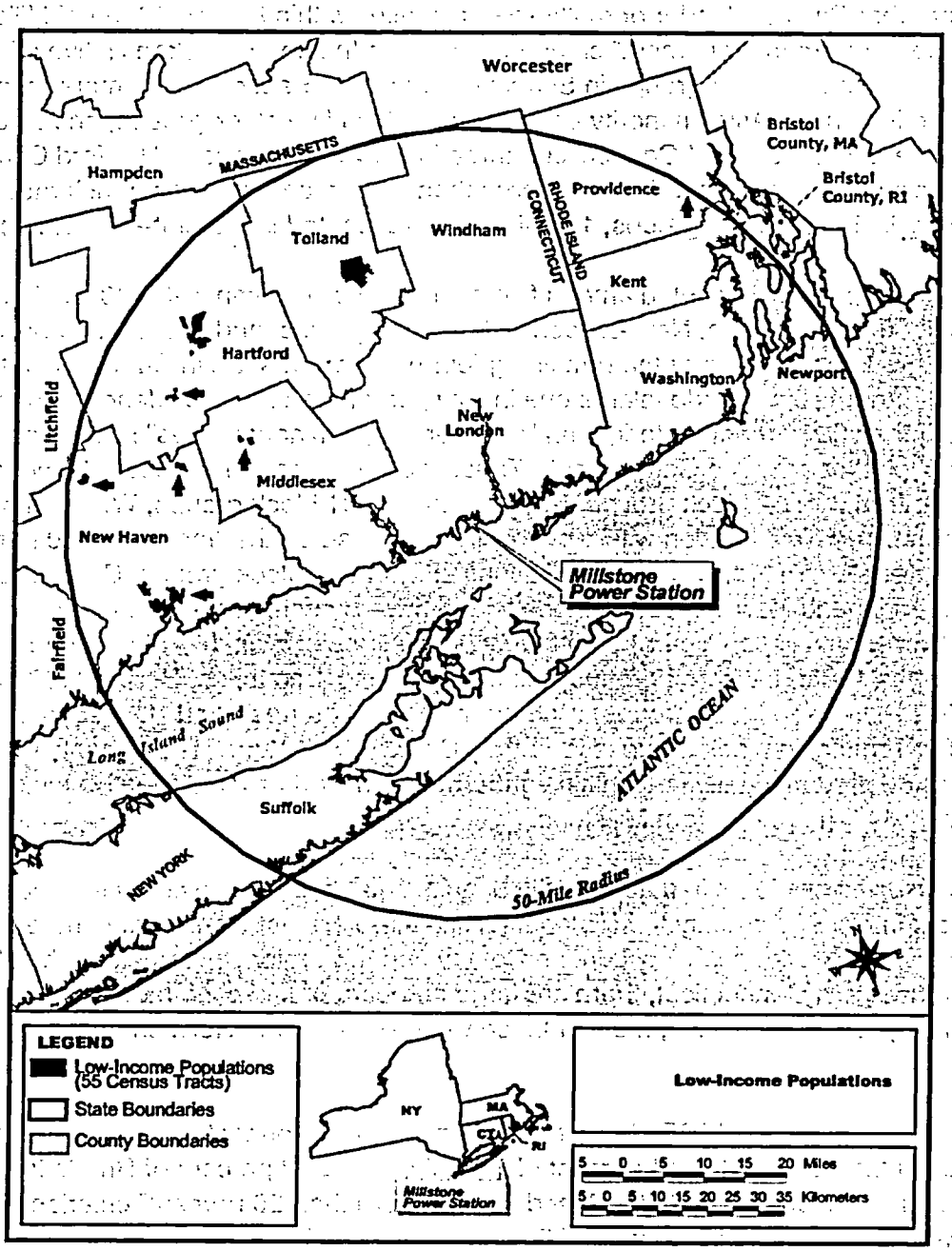

Figure 4-3. Geographic Distribution of Low-Income Populations (shown in shaded areas) Within 80 km (50 mi) of Millstone Based on Census Block Group Data [a]

(a) Note: Some of the census block groups extend into open water.

Based on the "more than 20 percent" or the "exceeds 50 percent" criteria, there are no Native Hawaiian or other Pacific Islander or multiracial minorities within 80 km (50 mi) of Millstone. Based on the "more than 20 percent" criterion, American Indian or Alaskan Native minority populations exist in two block groups in Suffolk County, NY. Based on the "more than 20 percent" criterion, an Asian minority population exists in five block groups, and all of these block groups are in the state of Connecticut: three in New Haven, one in Hartford County and the fifth in Tolland County. Based on the "more than 20 percent" criterion, Black races minority populations exist in 193 block groups, 189 of which are located in the state of Connecticut.

These block groups are distributed among five counties: New Haven with 103 block groups, Hartford with 80 block groups, New London with 4 block groups, and Tolland and Middlesex with 1 block group each. Two of the remaining four block groups are in Suffolk County, New York and the other two in Rhode Island: one in Newport and one in Providence County. Based on the "more than 20 percent" criterion, an "all other single minority races" population exists in 88 block groups that are all in Connecticut. These block groups are distributed among four counties: Hartford with 52 block groups, New Haven with 31 block groups, Windham with 4 block groups, and New London with 1 block group. Based on the "more than 20 percent" criterion, aggregate of minority races populations exist in 331 block groups: Connecticut has 325 block groups, and New York and Rhode Island have 3 each. Based on the "more than 20 percent" criterion, Hispanic ethnicity minority populations exist in 169 block groups. Connecticut has 168 of the block groups distributed among 4 counties: Hartford (83 block groups), New Haven (76 block groups), Windham (6 block groups), and New London (3 block groups). The remaining block group is in Suffolk County, New York. The minority populations identified reside predominantly in ethnic neighborhoods in Hartford and New Haven, approximately 64 km (40 mi) from Millstone.

Very few census blocks identified as minority populations under the environmental justice criteria, occur in closer proximity to Millstone. While there are not significant numbers of migrant agricultural workers in New London County and the region, according to the United Way of Southeastern Connecticut, there are large numbers of low-paid, mostly Asian, service workers employed at the casinos; most of these workers live in the Norwich area.

Dominion reported that the USCB characterized 8 percent of Connecticut, approximately 9 percent of all Massachusetts, 14 percent of New York, and 12 percent of Rhode Island households as "low income" in 2000. Based on the "more than 20 percent" criterion, 55 tracts contain low-income populations and 54 of these tracts are in Connecticut. The other one is in Rhode Island. These low-income households are predominantly in Hartford and New Haven, both approximately 64 km (40 mi) from Millstone (Dominion 2004a).

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 2004c), air, land, and water resources within 80 km (50 mi) of Millstone 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 Millstone license renewal could affect human populations are discussed throughout this SEIS. 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 Millstone to minority and low-income populations would be SMALL, and no additional mitigation measures would be warranted.

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 Millstone Power Station, Units 2 and 3 ground-water use and quality are listed in Table 4-15. Dominion stated in its ER that it is not aware of any new and significant information associated with the renewal of the Millstone Power Station, Units 2 and 3. The staff has not identified any new and significant information during its independent review of the Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. 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 would be SMALL, and additional plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

Table 4-15. Category 1 Issues Applicable to Ground-water 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 quality degradation (saltwater intrusion)	4.8.2.1

A brief description of the staff's review and the GEIS conclusions, as codified in Table B-1, 10 CFR 51, follows. (For each issue below, references to the Dominion ER are to Dominion 2004a.)

- 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, Millstone ground-water use is less than 0.068 m^3/s (100 gallons per minute [gpm]). The staff has not identified any new and significant information during its independent review of the Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and the public comments on the draft SEIS. Therefore, the staff concludes that there would be no ground-water use conflicts during the renewal term beyond those discussed in the GEIS.

- Ground-water quality degradation (saltwater intrusion). Based on information in the GEIS, the Commission found that

  > Nuclear power plants do not contribute significantly to saltwater intrusion.

  The staff has not identified any new and significant information during its independent review of the Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and the public comments on the draft SEIS. Therefore, the staff concludes that there would be no ground-water quality degradation impacts associated with saltwater intrusion during the renewal term beyond those discussed in the GEIS.

There are no Category 2 issues related to ground-water use and quality for Millstone.

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 4-16.

The issue of threatened or endangered species present at the Millstone site requires consultation with appropriate agencies to determine whether any such species are present and whether they would be adversely affected by continued operation of the nuclear plant during the license renewal term. The staff consulted with the FWS and NOAA Fisheries under provisions of Section 7 of the Endangered Species Act (ESA) concerning the potential impacts of an additional 20 years of operation and maintenance activities at Millstone on Federally listed

Table 4-16. 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

species. The staff initiated consultation by requesting a list of threatened and endangered species (NRC 2004a, 2004b). FWS and NOAA Fisheries responded with a list of species that potentially occur in the project area (FWS 2004a; NOAA 2004). In November 2004, the staff sent a biological assessment (BA) to FWS and NOAA Fisheries and requested concurrences with the BA (NRC 2004e, 2004f). The FWS concurred with the staff's conclusions in a letter dated January 5, 2005 (FWS 2005). On January 12, 2005, NOAA Fisheries concurred with the staff's conclusions related to whales and sturgeon (NOAA 2005). They also concluded that continued operations of Millstone is not likely to adversely affect the protected turtle species. Copies of the letters between NRC and FWS and NOAA Fisheries are included in Appendix E. During the course of its evaluation, the staff considered mitigation measures for continued operation of Millstone. Based on this evaluation, the staff expects that current mitigation measures are appropriate, and no additional mitigation is warranted.

4.6.1 Aquatic Species

The known range of eight Federally listed marine species includes Long Island Sound. These include three species of whales—North Atlantic right whale (*Balaena glacialis*), finback whale (*Balaenoptera physalus*), and humpback whale (*Megaptera novaeangliae*)—and four species of sea turtle—loggerhead turtle (*Caretta caretta*), green turtle (*Chelonia mydas*), leatherback turtle (*Demochelys cariacea*), and Kemp's (Atlantic) ridley turtle (*Lepidochelys kempii*) (FWS 2004b). The shortnose sturgeon (*Acipenser brevirostrum*) is a Federally listed endangered species that is found in the Connecticut River and parts of Long Island Sound and is known to venture into salt water. The staff included the shortnose sturgeon in its impact analysis. The staff has evaluated the potential impact on these eight species from an additional 20 years of operation of Millstone and documented in its evaluation in a BA (see Appendix E).

Based on the evaluation in the BA, the staff has concluded that continued operation of the plant during the license renewal term would have no effect on the North Atlantic right whale, the finback whale, the humpback whale, and the shortnose sturgeon. The staff also has concluded that continued operation of the plant during the license renewal term is not likely to adversely affect loggerhead turtle, green turtle, leatherback turtle, and Kemp's ridley turtle. Based on its

evaluation, the staff's conclusion is that the potential impacts on threatened and endangered aquatic species from an additional 20 years of operation of Millstone would be SMALL.

4.6.2 Terrestrial Species

Six terrestrial species that are Federally protected under the ESA are known from counties in Connecticut that contain the Millstone site or are crossed by the Millstone transmission line ROWs. Two of the species, the piping plover (*Charadrius melodus*) and the Puritan tiger beetle (*Cicindela puritana*), are not known or not likely to be found in the future from the site or transmission ROWs. These two species are unlikely to be affected by station operation during the renewal period. Both the bald eagle (*Haliaeetus leucocephalus*) and the roseate tern (*Sterna dougallii*) are known to occasionally use the Millstone site. The New England cottontail rabbit (*Sylvilagus transitionalis*) is not reported from the site or transmission ROWs. However, the habitat maintained by CL&P along the ROWs may be attractive to this species. Habitat for the small whorled pogonia (*Isotria medeoloides*) may exist at the Millstone site or along associated transmission line ROWs. Maintenance practices are unlikely to adversely impact specimens of this species if it exists at the site or along the transmission line ROWs.

The staff has determined that license renewal for Millstone would have no effect on the Puritan tiger beetle and the piping plover and may affect, but it is not likely to adversely affect, the bald eagle, the roseate tern, the New England cottontail, and the small whorled pogonia. Therefore, the staff concludes that the potential impacts of an additional 20 years of operation and maintenance of Millstone on Federal endangered, threatened, proposed, or candidate terrestrial species would be SMALL.

4.7 Evaluation of Potential New and Significant Information on Impacts of Operations During the Renewal Term

As discussed in Section 4.3, radiation exposure issues for the license renewal term are Category 1 issues. During the scoping process and the comment period on the draft SEIS, members of the public (1) expressed concern about the possible impacts on human health from exposure to radiation from Millstone's effluents and (2) cited a number of documents to support their concerns. The NRC Staff reviewed these documents as potential new and significant information regarding the Category 1 radiation exposure issues.

Although radiation may cause cancers at high doses and high dose rates, currently there are no data that unequivocally establish the occurrence of cancer following exposure to low doses and dose rates below 100 millisievert (mSv) (10,000 millirem [mrem]). However, radiation protection experts conservatively assume that any amount of radiation may pose some risk of causing cancer or a severe hereditary or teratogenic effect and that the risk is higher for higher radiation exposures. Therefore, a linear, no-threshold dose-response relationship is used to describe the

relationship between radiation dose and detriments such as cancer induction. Simply stated, any increase in dose, no matter how small, results in an incremental increase in health risk. This theory is accepted by the NRC as a conservative model for estimating health risks from radiation exposure, recognizing that the model probably overestimates those risks.

Thousands of studies have been performed on the biological effects of radiation exposure. None of the scientifically valid studies show health effects at acute doses less than 100 mSv (10,000 mrem). Based on the consensus of the conclusions of national and international experts such as the National Council on Radiation Protection and Measurements and the International Commission on Radiological Protection (ICRP), the NRC and EPA have established conservative dose limits for the protection of human health. In 40 CFR Part 190, EPA set a limit of 25 mrem/yr to the whole body of a member of the public from the entire nuclear fuel cycle, including nuclear power plants. NRC established dose design objectives in 10 CFR Part 50, Appendix I, to implement the EPA standards for radiological effluents from nuclear power plants.

As discussed in Sections 2.1.4, 2.2.7, and 4.3 of this SEIS, Dominion monitors the amounts of radionuclides released in the effluents from Millstone to ensure compliance with these regulations. Dominion also conducts an environmental radiological monitoring program to confirm the expected levels of radioactive materials in the area around Millstone. Based on recent experience, the NRC staff expects the releases of radioactive material from Millstone to be well within regulations during the license renewal period and much less than 1 millirem per year (mrem/yr) to the maximally exposed member of the public. The same member of the public receives an average dose of approximately 360 mrem/yr from natural background and medical sources of radiation (NRC 2005a). The NRC inspects Dominion's radiological effluent and environmental radiological monitoring programs at Millstone, and CTDEP also conducts environmental radiological monitoring around Millstone.

Cancer is not rare; in fact, cancer is very common in the U.S. population. According to the American Cancer Society, more than a half million Americans die from cancer each year, more than 1500 people a day. There are many possible causes and risk factors for cancer, including radiation exposure. However, according to the health risk estimates in ICRP Publication 60 (ICRP 1990), the risk of radiation exposure causing cancer is extremely low at doses below 1 mrem/yr.

In 1990, at the request of Congress, the National Cancer Institute (NCI) conducted a study, "Cancer in Populations Living Near Nuclear Facilities," to look at cancer mortality rates around 52 nuclear power plants (including Millstone), nine Department of Energy facilities, and one former commercial fuel reprocessing facility (NCI 1990). The study "produced no evidence that an excess occurrence of cancer has resulted from living near nuclear facilities." In addition, based on analyses of data from the Connecticut Tumor Registry, the Connecticut State

Department of Public Health (CTDPH) concluded that there is no evidence of increased cancer incidence in Connecticut due to radiation exposure from Millstone (NRC 2005b).

During scoping, some commenters stated that operation of Millstone resulted in excess cancers in the population around the plant site. Several reports were cited including the following: *Elevated Childhood Cancer Incidents Proximate to U.S. Nuclear Power Plants* (Mangano et al. 2003), *2,500 Excess Cancer Cases in New London County Since 1970: Radioactive Emissions from Millstone May Be The Cause* (Mangano 1998), *Cancer in Populations Living Near Nuclear Facilities* (National Cancer Institute 1990), and *Cancer Incidence in Connecticut Counties, 1995–1999* (CTDPH 2004). During scoping, other commenters stated that there is no relationship between cancer incidence and nuclear power plants, citing a Connecticut Academy of Science and Engineering (CASE) study titled *Study of Radiation from the Connecticut Yankee Nuclear Power Plant* (CASE 2000) and *Cancer in Populations Living Near Nuclear Facilities* (National Cancer Institute 1990). These reports and referenced studies were based on data obtained from the Connecticut Tumor Registry and the Surveillance, Epidemiology, and End Result (SEER) reports, which are published by NCI.

Mangano (1998) provided summary information on cancer incidence and mortality rates in New London County and the four towns near Millstone before and after startup. The information summarized appears to be based on the Connecticut Tumor Registry data and an NCI report (NCI 1990). Mangano (1998) suggested that the increase in cancer may be related to operations at Millstone; however, no evidence was provided to support a causal relationship between increased cancer incidence and Millstone operations.

Mangano et al. (2003) performed a more extensive review of cancer incidence and mortality for children living within 48 km (30 mi) of 14 nuclear power plants in the eastern U.S. (including Millstone) from 1970 through 1997. The cancer incidence and mortality rates were compared with data considered to be representative of the U.S. population. Mangano et al. (2003) reported no significant difference in childhood cancer mortality rates between counties surrounding the nuclear power plants and the U.S. population. However, Mangano et al. (2003) referenced an NCI report (NCI 1990) that showed a significantly increased relative risk of leukemia in children ages 0 to 9 years who lived in five counties near four nuclear plants in Connecticut and Iowa. Similarly, the incidence rate for all cancers for children 0 to 9 years in counties near Millstone was 1.0 percent higher compared to the incidence estimate for the remainder of Connecticut and Rhode Island. The mortality rate for all cancers for children 0 to 9 years in counties near Millstone was 26.7 percent lower than the U.S. rate (Mangano et al. 2003).

The NCI study (NCI 1990) reviewed 35 years of cancer incidence and mortality data for counties where 62 nuclear facilities are located. These data were compared with the cancer rates of comparable regional counties located away from nuclear facilities. The study reported that the relative risk of leukemia for New London County (location of Millstone) was significantly

higher compared to the control counties for leukemia for children under 10 years (NCI 1990). The relative risk was the highest of all sites reported (relative risk of 3.04, where 1.0 indicates the same relative risk compared to the control counties). The study stated that this high risk, in part, reflected the unusually low incidence of cancer in the control counties compared to the national rate. The report also noted that the incidence of leukemia in children under 10 in New London County was elevated before startup of Millstone. There were 30 cases of leukemia in children from 1961 to 1970 before Millstone startup (30 cases in 10 years is 3.00 cases per year) and 44 cases from 1971 to 1984 after Millstone startup (44 cases in 14 years is 3.15 cases per year before correction for population increase). The report (NCI 1990) concluded:

> Comparisons of study and control counties exhibit substantial variation, as should be expected, because the matching cannot remove all variation due to demographic factors. Properly taking this into account, there is no evidence of systematically higher cancer risks in the study counties. Moreover, even the highest relative risks for individual facilities were compatible with the general level of variation seen....

The NCI report "found no suggestion that nuclear facilities may be linked causally with excess deaths from leukemia or from other cancers in the populations living nearby." John Boice, Sc.D., chief of NCI's Radiation Epidemiology Branch at the time of the survey, concluded: "From the data at hand, there was no convincing evidence of any increased risk of death from any of the cancers we surveyed due to living near nuclear facilities...." (NCI 2002).

The CTDPH reported cancer incidence rates for the period 1995 to 1999 for Connecticut towns (CTDPH 2002) and counties (CTDPH 2004). Both reports were based on data from the Connecticut Tumor Registry. The county report compared cancer incidence rates for various forms of cancer for each county with the average cancer incidence rate for the State. New London County had the highest incidence rate for all invasive tumors for females and for several forms of cancer for one or both genders. The report for the towns compared the observed number of cancers for various forms of cancer for each town with the expected number of cancers based on the average incidence rates for the State and presented ratios of observed cases to expected cases. The town of Waterford did not have the highest ratio of observed cancers to expected cancers for any form of cancer analyzed. Waterford was in the highest ratio quartile for colorectal cancer in males, lung cancer in females, and melanomas (skin cancer) in females; however, for each of these cancer forms, several other towns had higher ratios.

The CASE study (2000) was initiated because of citizen concerns regarding the potential health impacts from nuclear power plants. The study focused on the Connecticut Yankee plant; however, the report included analyses of leukemia, thyroid cancer, and multiple myeloma from the Connecticut Tumor Registry from 1976 to 1995 for each of Connecticut's 169 towns. The maps in the report show the ratio of the observed cancer cases versus the expected cancer

cases based on the state average incidence and the town population. The town of Waterford was not in the highest ratio category for any cancer except thyroid cancer, and at least three other towns had higher ratios for thyroid cancer. At least 30 towns had higher ratios than Waterford for pediatric leukemia (ages 0 to 14).

The NRC staff and its contractors discussed Millstone's history of radiological effluent and environmental monitoring with officials from CTDEP's Division of Radiation. The reports cited above by CTDPH, CASE, and NCI were also discussed. CTDEP conducts its own radiological environmental monitoring program around Millstone. CTDEP had also reviewed the reports by CTDPH, CASE, and NCI. CTDEP concluded that Millstone's radiological effluent and environmental monitoring data were accurate. CTDEP also concluded that the reports cited above by CTDPH, CASE, and NCI reports showed no evidence of a causal link between public exposure to Millstone's radiological effluents and cancer incidence or mortality rates in Connecticut towns.

In the GEIS, radiation exposure to the public during the license renewal term was considered a Category 1 issue (see Chapter 1 and Section 4.3 for a discussion of Category 1 issues and radiological impacts from normal operations). The GEIS concluded that the risk to the public from continued operation of a nuclear plant would not increase during the license renewal term. Doses to members of the public from Millstone emissions were specifically evaluated in Appendix E of the GEIS and were found to be well within regulatory limits.

During the comment period for the draft SEIS, a number of commenters expressed concern that operation of Millstone results in excess cancers in the population around the plant site. Commenters cited the following documents in support of these concerns:

- House of Representatives. 101st Congress, 2d session. Report 101-463. Radiation Exposure Compensation Act. April 25, 1990.
- State of Connecticut. Department of Public Health. Connecticut Tumor Registry. *Cancer Incidence in Connecticut Counties, 1995-99.* January 2004.
- Steinberg, M. 1998. *Millstone and Me: Sex, Lies and Radiation In Southeastern Connecticut.* Black Rain Press. Niantic, Connecticut. October 1998.
- Exhibit by Cynthia Besade, "Millstone Community Cancer Victims Personally Known."
- Remarks and exhibit by Gail Merill, (3 Pages) including: *Risks of Cancer and Other Diseases From the Operation of Millstone Nuclear Plant,* by Joseph Mangano, MPH, MBA. August 5, 2004.
- Exhibits by Michael Steinberg, Radiation and Public Health Project. Risk of Cancer and Other Diseases from the Operation of the Millstone Nuclear Unit" (14 Pages), "Local health declines when Millstone opens, improves after closing" (1 Page)
- Memo from E.J. Sternglass to Nancy Burton, Esq. Subject: Synergistic interaction of radiation, air pollution and chemicals. March 8, 2005

- *WISE/NIRS Nuclear Monitor* 583 9. "ECRR report challenges entrenched radiation assumptions." February 21, 2003.
- State of Connecticut. Department of Public Health. Connecticut Tumor Registry. *Incidence of Selected Cancers in Connecticut by Town 1995-99.* May 2002.
- Navab, V., R. Hawkins, and M. Resnikoff. 2003. "Health effects of selected industrial chemicals and radionuclides: an introduction." *STAND Technical Report* 2003–2. July 2003.
- Chart titled: *Percent increase in cancer incidence, cancer mortality and other health effects of human exposure to ionizing radiation.* Accessed at: http://www.nirs.org/radiation/radchart.htm. on March 13, 2005.
- Benoit,G., P. Patton, and C. Arnold. 1999. "Trace Metals and Radionuclides Reveal Sediment Sources and Accumulation Rates in Jordan Cove, Connecticut." *Estuaries.* Vol.22, No.1. March 1999.

NRC's dose limits are conservative and supported by the EPA and international agencies, such as ICRP, United Nations Scientific Committee on the Effects of Atomic Radiation, and the European Commission on Radiation Protection. Review and evaluation of new studies and analyses of the health effects of radiation exposure is an ongoing process at the NRC. The scientifically defensible epidemiological studies on the biological effects of ionizing radiation provide solid evidence that the current regulatory standards are protective of human health. Dominion has demonstrated that releases from Millstone during the renewal period are expected to be below regulatory limits.

The NRC staff has reviewed all of the documents listed above and finds that the information in these documents fails to demonstrate that the analysis in the GEIS (as codified in 10 CFR Part 51, Subpart A, Appendix B, Table B-1) of the human health impact of radiation exposure resulting from the operation of Millstone is incorrect.

The staff concludes that the information provided during the scoping process and comment period on the draft SEIS was not new and significant with respect to the findings of the GEIS on the health effects to the public from radiological effluent releases due to Millstone operations.

4.8 Cumulative Impacts of Operations During the Renewal Term

The staff considered potential cumulative impacts during the evaluation of information applicable to each of the potential impacts identified within the GEIS. The impacts of the proposed license renewal are combined with other past, present, and reasonably foreseeable future actions to determine whether cumulative impacts exist. For the purposes of this analysis, past actions were those related to the resources at the time of the plant licensing and construction. Current actions are the operation of the power plant and future actions are

considered to be those that are reasonably foreseeable through the end of plant operation. Therefore, the analysis considers potential impacts through the end of the current license term, as well as the 20-year license renewal term. The geographical area over which past, present, and future actions that could contribute to cumulative impacts is dependent on the type of action considered, and is described below for each impact area.

4.8.1 Cumulative Impacts Resulting from Operation of the Plant Cooling System

For the purposes of this analysis, the geographic area considered is the 80-km (50-mi) region surrounding Millstone. As described in Section 4.1, the staff found no new and significant information indicating that the conclusions regarding any of the cooling-system-related Category 1 issues as related to Millstone are inconsistent with the conclusions in the GEIS. Additionally, the staff has determined that with the exception of entrainment, none of the cooling-system-related Category 2 issues were likely to have greater than a SMALL impact on local water quality or aquatic resources. The staff has determined that entrainment would likely have a MODERATE impact on aquatic resources. As described in Section 2.1.3, Millstone uses the Niantic Bay as a source of cooling water for its condenser. The Niantic Bay is fed by the Niantic River and is connected hydrologically to Long Island Sound. The continuing low winter flounder population levels are likely a result of multiple impacts including fishing mortality, entrainment from Millstone water withdrawals, environmental changes associated with regional increases in water temperature, and predator-prey interactions. In addition, changes to water and sediment quality from runoff, urbanization, and industrial activities may also be stressors. Therefore, the cumulative impact from continued operation of Millstone plant cooling system would be MODERATE. Dominion is involved in an ongoing review of the impacts from Millstone impingement and entrainment related to renewal of its NPDES permit. Additionally, new regulations promulgated by EPA related to intake structure performance standards will require further assessment of intake related impacts. Any additional mitigation related to the NPDES review and EPA's new performance requirements will result in less impact to the Long Island Sound fisheries.

4.8.2 Cumulative Impacts Resulting from Continued Operation of the Transmission Lines

The continued operation of the electrical transmission facilities connecting Millstone to the transmission grid was evaluated to determine if there is the potential for interactions with other past, present, and future actions that could result in adverse cumulative impacts—including both the acute and chronic effects of electromagnetic fields—to terrestrial resources, such as wildlife populations and the size and distribution of habitat areas, and to aquatic resources such as wetlands and floodplains. For the purposes of this analysis, the geographic area that encompasses the past, present and foreseeable future actions that could contribute to adverse cumulative impacts is the area within 80 km (50 mi) of the Millstone site, as depicted in Figure 2-1. As described in Section 4.2, the staff found no new and significant information

indicating that the conclusions regarding any of the transmission line-related Category 1 issues related to Millstone are inconsistent with the conclusions in the GEIS. For the Category 2 issue related to electromagnetic fields—acute impacts (electric shock)—the impact would be SMALL and the uncategorized issue of chronic impacts is still considered "not applicable." There are no known or planned activities within the 80-km (50-mi) radius area of consideration that could potentially produce additional impacts associated with transmission lines. Therefore, the cumulative impacts would be SMALL, and no additional mitigation measures are warranted.

4.8.3 Cumulative Radiological Impacts

The radiological dose limits for protection of the public and workers have been developed by EPA and NRC to address the cumulative impact of acute and long-term exposure to radiation and radioactive material. As described in Section 2.2.7, the public and occupational doses resulting from operation of Millstone are within regulatory limits, and as described in Section 4.3, the impacts of these doses are expected to be SMALL during the license renewal period. For the purposes of this analysis, the area within an 80-km (50-mi) radius of the Millstone plant was included (see Figure 2-1). EPA regulations in 40 CFR 190 limit the dose to members of the public from all sources in the nuclear fuel cycle in the United States, including all nuclear power plants, fuel fabrication facilities, waste disposal facilities, and transport of fuel and waste. In addition, the radiological environmental monitoring program conducted by Dominion in the vicinity of Millstone measures radiation and radioactive material from all sources, including Millstone; therefore, the monitoring program measures cumulative radiological impacts. There are no known or planned activities; however, the NRC and the state of Connecticut would regulate any future actions in the vicinity of Millstone that could contribute to cumulative radiological impacts. Therefore, the staff determined that the cumulative radiological impacts of continued operation of Millstone would be SMALL, and that no additional mitigation is warranted.

4.8.4 Cumulative Socioeconomic Impacts

Much of the analyses of socioeconomic impacts presented in Section 4.4 of this SEIS already incorporate cumulative impact analysis because the metrics used for quantification only make sense when placed in the total or cumulative context. For instance, the impact of the total number of additional housing units that may be needed can only be evaluated with respect to the total number that is expected to be available in the impacted area. Therefore, the geographical area of the cumulative impact analysis varies depending on the particular impact considered, and may depend on specific boundaries, such as taxation jurisdictions, or may be distance related, as in the case of environmental justice.

The continued operation of Millstone is not likely to add to any cumulative socioeconomic impacts beyond those evaluated in Section 4.4. In other words, the impacts of issues such as transportation or offsite land use are likely to be undetectable beyond the regions previously

evaluated and will quickly decrease with increasing distance from the site. The staff has determined that the impacts of license renewal on housing, public utilities, public services, and environmental justice would all be SMALL. The staff has determined that the impact of license renewal on offsite land use would be SMALL because, even though Millstone provides greater than 10 percent of the property tax revenue for the town of Waterford, there are no refurbishment actions planned at Millstone. There are no reasonably foreseeable scenarios that would alter these conclusions with regard to cumulative impacts.

Related to historic resources, there are no structures eligible for the inclusion in the National Register of Historic Places on the Millstone site or along the transmission lines. The staff has concluded that the impacts of license renewal on historic resources would be SMALL. The continued operation and maintenance of the Millstone site and transmission line ROWs would not be expected to impact any properties beyond the site or ROW boundaries. Therefore, the contribution to a cumulative impact on historic resources would be negligible.

Based on these considerations, the staff concludes that continued operation of Millstone is not likely to make a detectable contribution to the cumulative impacts associated with any of the socioeconomic issues discussed in Section 4.4 and, therefore, that the cumulative impacts would be SMALL, and no additional mitigation measures are warranted.

4.8.5 Cumulative Impacts on Ground-water Use and Quality

The Millstone ground-water use is less than 100 gpm. The expected impact on the aquifer due to continued plant operations and ground-water withdrawals would be SMALL as discussed in Section 4.5. There are no known or planned projects that would require withdrawal of groundwater that, if implemented in addition to license renewal, would potentially cause an adverse impact on groundwater. Therefore, the cumulative impact would be SMALL, and no additional mitigation measures are warranted.

4.8.6 Cumulative Impacts on Threatened or Endangered Species

The geographic area considered in the analysis of cumulative impacts to threatened or endangered species includes the Millstone site and the associated transmission line ROWs. As discussed in Sections 2.2.5 and 2.2.6, there are several threatened or endangered species that occur within this area. However, the staff determined in Section 4.6 that continued operation of Millstone would have no impact or is not likely to adversely affect any of these species. Therefore, the continued operation of Millstone would not be expected to contribute to a regional cumulative impact to these species, regardless of whether other actions occur that could have adverse impacts.

Therefore, the staff has determined that the cumulative impacts to threatened or endangered species due to continued operation at the Millstone site and associated transmission line ROWs would be SMALL, and that additional mitigation measures would not be warranted.

4.9 Summary of Impacts of Operations During the Renewal Term

Neither Dominion 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 operation of Millstone 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.

In Chapter 4, plant-specific environmental evaluations were conducted for 10 Category 2 issues applicable to Millstone operation during the renewal term and for environmental justice and chronic impacts of electromagnetic fields. For nine issues and environmental justice, the staff concluded that the potential environmental impact of renewal term operations of Millstone 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 entrainment, the staff's conclusion is that the impact resulting from license renewal would be MODERATE. In addition, the staff determined that a consensus has not been reached by appropriate Federal health agencies regarding chronic adverse impacts from electromagnetic fields. Therefore, the staff did not further evaluate this issue.

4.10 References

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

36 CFR Part 800. Code of Federal Regulations, Title 36, *Parks, Forests, and Public Property,* Part 800, "Advisory Council on Historic Preservation."

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

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5.0 Environmental Impacts of Postulated Accidents

Environmental issues associated with postulated accidents 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 issue 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) 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 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 describes the environmental impacts from postulated accidents that might occur during the license renewal term.

5.1 Postulated Plant Accidents

Two classes of accidents are evaluated in the GEIS. These are design-basis accidents (DBAs) and severe accidents, as discussed below.

(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.

5.1.1 Design-Basis Accidents

In order to receive NRC approval to operate a nuclear power facility, an applicant for an initial operating license must submit a safety analysis report (SAR) as part of its application. The SAR presents the design criteria and design information for the proposed reactor and comprehensive data on the proposed site. The SAR also discusses various hypothetical accident situations and the safety features that are provided to prevent and mitigate accidents. The NRC staff reviews the application to determine whether the plant design meets the Commission's regulations and requirements and includes, in part, the nuclear plant design and its anticipated response to an accident.

DBAs are those accidents that both the licensee and the NRC staff evaluate to ensure that the plant can withstand normal and abnormal transients, and a broad spectrum of postulated accidents, without undue hazard to the health and safety of the public. A number of these postulated accidents are not expected to occur during the life of the plant but are evaluated to establish the design basis for the preventive and mitigative safety systems of the facility. The acceptance criteria for DBAs are described in 10 CFR Part 50 and 10 CFR Part 100.

The environmental impacts of DBAs are evaluated during the initial licensing process, and the ability of the plant to withstand these accidents is demonstrated to be acceptable before issuance of the operating licenses (OLs). The results of these evaluations are found in license documentation such as the applicant's final safety analysis report (FSAR), the staff's safety evaluation report (SER), the final environmental statement (FES), and Section 5.1 of this supplemental environmental impact statement (SEIS). A licensee is required to maintain the acceptable design and performance criteria throughout the life of the plant, including any extended-life operation. The consequences for these events are evaluated for the hypothetical maximally exposed individual; as such, changes in the plant environment will not affect these evaluations. Because of the requirements that continuous acceptability of the consequences and aging management programs be in effect for license renewal, the environmental impacts as calculated for DBAs should not differ significantly from initial licensing assessments over the life of the plant, including the license renewal period. Accordingly, the design of the plant relative to DBAs during the extended period is considered to remain acceptable and the environmental impacts of those accidents were not examined further in the GEIS.

The Commission has determined that the environmental impacts of DBAs are of SMALL significance for all plants because the plants were designed to successfully withstand these accidents. Therefore, for the purposes of license renewal, DBAs are designated as a Category 1 issue in 10 CFR Part 51, Subpart A, Appendix B, Table B-1. The early resolution of

the DBAs makes them a part of the current licensing basis of the plant; the current licensing basis of the plant is to be maintained by the licensee under its current license and, therefore, under the provisions of 10 CFR 54.30, is not subject to review under license renewal. This issue, applicable to Millstone, Units 2 and 3 (Millstone), is listed in Table 5-1.

Table 5-1. Category 1 Issue Applicable to Postulated Accidents During the Renewal Term

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Sections
POSTULATED ACCIDENTS	
Design basis accidents	5.3.2; 5.5.1

Based on information in the GEIS, the Commission found that:

> The NRC staff has concluded that the environmental impacts of design basis accidents are of small significance for all plants.

Dominion Nuclear Connecticut, Inc. (Dominion) stated in its Environmental Report (ER) (Dominion 2004) that it is not aware of any significant new and significant information associated with the renewal of the Millstone OLs. The staff has not identified any significant new information during its independent review of the Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there are no impacts related to design basis accidents beyond those discussed in the GEIS.

5.1.2 Severe Accidents

Severe nuclear accidents are those that are more severe than DBAs because they could result in substantial damage to the reactor core, whether or not there are serious offsite consequences. In the GEIS, the staff assessed the impacts of severe accidents during the license renewal period, using the results of existing analyses and site-specific information to conservatively predict the environmental impacts of severe accidents for each plant during the renewal period.

Severe accidents initiated by external phenomena such as tornadoes, floods, earthquakes, fires, and sabotage have not traditionally been discussed in quantitative terms in final environmental statements (FESs) and were not specifically considered for the Millstone site in the GEIS (NRC 1996). However, in the GEIS the staff did evaluate existing impact assessments performed by NRC and by the industry at 44 nuclear plants in the United States and concluded that the risk from sabotage and beyond design basis earthquakes at existing

nuclear power plants is SMALL. Additionally, the staff concluded that the risks from other external events are adequately addressed by a generic consideration of internally initiated severe accidents.

Based on information in the GEIS, the Commission found that:

> The probability weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to groundwater, and societal and economic impacts from severe accidents are small for all plants. However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives.

Therefore, the Commission has designated mitigation of severe accidents as a Category 2 issue in 10 CFR Part 51, Subpart A, Appendix B, Table B-1. This issue, applicable to Millstone, is listed in Table 5-2.

Table 5-2. Category 2 Issue Applicable to Postulated Accidents 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
	POSTULATED ACCIDENTS		
Severe accidents	5.3.3; 5.3.3.2; 5.3.3.3; 5.3.3.4; 5.3.3.5; 5.3.4; 5.4; 5.5.2	L	5.2

The staff has not identified any significant new information during its independent review of the Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there are no impacts of severe accidents beyond those discussed in the GEIS. However, in accordance with 10 CFR 51.53(c)(3)(ii)(L), the staff has reviewed severe accident mitigation alternatives (SAMAs) for Millstone. The results of its review are discussed in Section 5.2.

5.2 Severe Accident Mitigation Alternatives

Section 51.53(c)(3)(ii)(L) requires that license renewal applicants consider alternatives to mitigate severe accidents if the staff has not previously evaluated SAMAs for the applicant's plant in an environmental impact statement (EIS) or related supplement or in an environmental assessment. The purpose of this consideration is to ensure that plant changes (i.e., hardware, procedures, and training) with the potential for improving severe accident safety performance

are identified and evaluated. SAMAs have not been previously considered for Millstone; therefore, the remainder of Chapter 5 addresses those alternatives.

5.2.1 Introduction

This section presents a summary of the SAMA evaluations for Millstone conducted by Dominion and described in the ER and the NRC's review of those evaluations. The details of the review are described in the NRC staff evaluations that were prepared with contract assistance from Information Systems Laboratories, Inc. The evaluation for Millstone, Unit 2 is presented in Appendix H; the evaluation for Millstone, Unit 3 is presented in Appendix I. Dominion conducted the SAMA evaluations for Millstone using a four-step approach. In the first step, Dominion quantified the level of risk associated with potential reactor accidents using plant-specific probabilistic risk assessments (PRAs) and other risk models.

In the second step, Dominion examined the major risk contributors and identified possible ways (SAMAs) of reducing that risk. Common ways of reducing risk are changes to components, systems, procedures, and training. Dominion initially identified 196 potential SAMAs for Millstone, Unit 2 and 185 potential SAMAs for Millstone, Unit 3. Dominion screened out SAMAs that were not applicable to Millstone, had already been implemented at Millstone (or the Millstone design met the intent of the SAMA), or were related to reactor coolant pump (RCP) seal vulnerability stemming from charging pump dependency on the component cooling water (CCW) system. The Millstone units do not rely on component cooling water systems for RCP seal cooling. This screening reduced the list of potential SAMAs to 44 for Unit 2 and 52 for Unit 3.

In the third step, Dominion estimated the benefits and the costs associated with each of the remaining SAMAs. Estimates were made of how much each SAMA could reduce risk. Those estimates were developed in terms of dollars in accordance with NRC guidance for performing regulatory analyses (NRC 1997b). The cost of implementing the proposed SAMAs was also estimated.

Finally, in the fourth step, the costs and benefits of each of the remaining SAMAs were compared to determine whether the SAMA was cost beneficial, meaning the benefits of the SAMA were greater than the cost (a positive cost benefit). For Unit 2, Dominion determined in its ER that SAMA 3 would be cost beneficial. For Unit 3, Dominion determined that none of the SAMAs would be cost beneficial (Dominion 2004a).

The NRC reviewed Dominion's SAMA analyses. In response to a request for additional information (RAI) (NRC 2004), Dominion assessed the applicability and feasibility of several SAMAs for Unit 2 that were considered by another Combustion Engineering (CE) plant. As a result, Dominion eliminated all of the SAMAs questioned except one—adding a capability to

flash the field on the emergency diesel generator using a portable generator to enhance station blackout (SBO) event recovery. Dominion stated that this SAMA is not expected to be cost beneficial because it would likely require a plant modification to install a disconnect to allow the connection of a portable (temporary) generator, as well as development of a new severe accident management guideline (SAMG). However, Dominion stated that if this SAMA can be accomplished via a SAMG without a hardware modification, the SAMA would be cost beneficial and will be implemented prior to the period of extended operation (Dominion 2004b).

The staff questioned Dominion about lower cost alternatives to some of the SAMAs evaluated for Unit 3 (NRC 2004). As originally proposed, SAMA 112 involved physical modifications to provide steam generator level indication in an SBO scenario, as well as the development of an emergency operating procedure that would direct the manual control of the turbine-driven auxiliary feedwater (AFW) pump. This SAMA was estimated not to be cost beneficial. However, as an alternative to SAMA 112, Dominion considered the development of a SAMG without the hardware modification. This improvement could be effective in a more limited number of sequences in which AFW control power is lost, but steam generator level indications are not. The estimated benefit of this modification is greater than the expected cost after consideration of uncertainties; therefore, it is potentially cost beneficial. As indicated in its RAI response, Dominion plans to complete its evaluation of this SAMA and, if it is cost beneficial, will develop a SAMG addressing manual control of the turbine-driven AFW pump prior to the period of extended operation (Dominion 2004b).

None of these SAMAs relate to adequately managing the effects of aging during the period of extended operation; therefore, they need not be implemented as part of license renewal pursuant to 10 CFR Part 54. Dominion's SAMA analyses and the NRC's review are discussed in more detail below.

5.2.2 Estimate of Risk

Dominion submitted an assessment of SAMAs for Millstone as part of the ER (Dominion 2004a). This assessment was based on the most recent Millstone PRA available at that time, a plant-specific offsite consequence analysis performed using the MELCOR Accident Consequence Code System 2 computer program, and insights from the Millstone Individual Plant Examinations (IPE) for Unit 2 (NNECO 1993) and for Unit 3 (NNECO 1990) and Individual Plant Examination of External Events for Unit 2 (NNECO 1995) and for Unit 3 (NNECO 1991).

The baseline core damage frequency (CDF) for the purpose of the SAMA evaluation is approximately 7.17×10^{-5} per year for Unit 2 and approximately 2.57×10^{-5} per year for Unit 3. These CDFs are based on the risk assessment for internally initiated events. Dominion did not

include the contribution to risk from external events within the Millstone risk estimates; however, it did account for the potential risk reduction benefits associated with external events by increasing the estimated benefits for internal events by a factor of 1.3 for Unit 2 and a factor of 1.6 for Unit 3. The breakdown of CDF by initiating event for Units 2 and 3 is provided in Tables 5-3 and 5-4, respectively.

As shown in Table 5-3, loss-of-coolant accidents (LOCAs), loss of cooling water to the primary side components (COOL) including service water and reactor building closed cooling water (RBCCW), loss of DC power, and transients including anticipated transients without scram (ATWS) are dominant contributors to the CDF for Unit 2. LOCAs are dominated by small-break LOCAs, which make up about 36 percent of the total CDF. Bypass events [i.e., steam generator tube rupture (SGTR) and interfacing systems loss of coolant accident (ISLOCA)] contribute less than four percent to the total internal events CDF.

As shown in Table 5-4, LOCAs, RCP seal LOCAs, transients including ATWS, and loss of offsite power (LOOP) are dominant contributors to the CDF for Unit 3. Bypass events (i.e., SGTR and ISLOCA) contribute less than 5 percent to the total internal events CDF.

Table 5-3. Core Damage Frequency for Unit 2

Initiating Event or Accident Class	CDF (Per Year)	% Contribution to CDF
LOCA	2.66×10^{-5}	37.1
COOL	1.44×10^{-5}	20.1
Loss of DC power	1.03×10^{-5}	14.4
ATWS	8.68×10^{-6}	12.1
Transients	4.66×10^{-6}	6.5
SGTR	2.22×10^{-6}	3.1
SBO	2.15×10^{-6}	3.0
Steamline and main feed line breaks	1.72×10^{-6}	2.4
Loss of offsite power (LOOP)	8.60×10^{-7}	1.2
ISLOCA	1.43×10^{-7}	0.2
Total CDF	7.17×10^{-5}	100

Table 5-4. Core Damage Frequency for Unit 3

Initiating Event or Accident Class	CDF (Per Year)	% Contribution to CDF
RCP Seal LOCA	5.66×10^{-6}	22.0
Transients	4.04×10^{-6}	15.7
LOCAs	3.42×10^{-6}	13.3
LOOP	2.77×10^{-6}	10.8
ATWS	2.39×10^{-6}	9.3
Steamline break inside containment	2.31×10^{-6}	9.0
SBO	1.78×10^{-6}	6.9
Total loss of service water	1.28×10^{-6}	5.0
SGTR	1.00×10^{-6}	3.9
Loss of one vital DC bus	4.18×10^{-7}	1.6
Steamline break outside containment	3.79×10^{-7}	1.5
ISLOCA	2.21×10^{-7}	0.9
Instrument tube LOCA	5.04×10^{-8}	0.2
Total CDF	2.57×10^{-5}	100

In the ER, Dominion estimated the dose to the population within 80 kilometers (km) (50 miles [mi]) of the Millstone site from severe accidents to be approximately 0.174 person-sieverts (person-Sv) (17.4 person-roentgen equivalent man [person-rem]) per year for Unit 2 and approximately 0.128 person-Sv (12.8 person-rem) per year for Unit 3. The breakdown of the total population dose by containment release mode is summarized for Units 2 and 3 in Tables 5-5 and 5-6, respectively.

Intermediate containment failures dominate the population dose risk at Unit 2, followed by SGTR and late-containment failures. Early-containment failures and ISLOCAs make relatively small contributions, each being less than 3 percent of the total. Containment isolation and basemat failures are each indicated to be zero contributors to risk. As indicted in the response to an RAI, these release modes are incorporated into other release modes with similar characteristics (Dominion 2004b).

Late containment failures dominate the population dose risk at Unit 3, followed by SGTR and ISLOCAs. Early failures and containment isolation failures are each indicated to be zero contributors to risk. As indicated in the response to an RAI, these release modes were deleted from the IPE model because of low contribution (i.e., <0.1 percent) (Dominion 2004b).

Table 5-5. Breakdown of Population Dose by Containment Release Mode (Unit 2)

Containment Release Mode	Population Dose (Person-rem[a] Per Year)	% Contribution
Intermediate failure	12.4	71
SGTR	2.5	14.4
Late failure	1.63	9.4
Early failure	0.48	3
ISLOCA	0.42	2.4
Containment isolation failure	0	0
Basemat failure	0	0
Total Population Dose	17.4	100

(a) One person-rem = 0.01 person-Sv

Table 5-6. Breakdown of Population Dose by Containment Release Mode (Unit 3)

Containment Release Mode	Population Dose (Person-rem[a] Per Year)	% Contribution
Late failure	6.60	51.5
SGTR	2.77	21.6
ISLOCA	2.23	17.4
Intermediate failure	0.93	7.2
No containment failure	0.24	1.9
Basemat failure	0.05	0.4
Early failure	0	0
Containment isolation failure	0	0
Total Population Dose	12.8	100

(a) One person-rem = 0.01 person-Sv

The NRC staff has reviewed Dominion's data and evaluation methods and concludes that the quality of the risk analyses is adequate to support an assessment of the risk reduction potential for candidate SAMAs. Accordingly, the staff based its assessment of offsite risk on the CDFs and offsite doses reported by Dominion.

5.2.3 Potential Plant Improvements

Once the dominant contributors to plant risk were identified, Dominion searched for ways to reduce that risk. In identifying and evaluating potential SAMAs, Dominion considered SAMA analyses performed for other operating plants that have submitted license renewal applications, as well as industry and NRC documents that discuss potential plant improvements, such as NUREG-1560 (NRC 1997a). Dominion identified 196 potential risk-reducing improvements (SAMAs) to plant components, systems, procedures and training for Unit 2 and 185 for Unit 3.

For Unit 2, all but 44 of the the SAMAs were removed from further consideration because they were not applicable to Millstone, they had already been implemented at Millstone (or the Millstone design met the intent of the SAMA), or they were related to RCP seal vulnerability stemming from charging pump dependency on the component cooling water system. The Millstone units do not rely on component cooling water systems for RCP seal cooling. Unit 2 relies on the RBCCW rather than closed cooling water (CCW) for RCP seal cooling and, in Unit 3, the charging pumps do not rely on CCW for RCP seal cooling. For Unit 3, all but 52 of the SAMAs were removed from further consideration based on the same criteria.

The staff concludes that Dominion used a systematic and comprehensive process for identifying potential plant improvements for Millstone, and that the set of potential plant improvements identified by Dominion is reasonably comprehensive and, therefore, acceptable.

5.2.4 Evaluation of Risk Reduction and Costs of Improvements

Dominion evaluated the risk-reduction potential of the remaining 44 SAMAs that were applicable to Unit 2 and the remaining 52 SAMAs that were applicable to Unit 3. A majority of the SAMA evaluations were performed in a bounding fashion in that the SAMA was assumed to completely eliminate the risk associated with the proposed enhancement. The staff concludes that such bounding calculations overestimate the benefit of the risk reduction and are conservative.

Dominion estimated the potential benefits for each SAMA by generating a revised set of plant damage state frequencies. Using these revised frequencies, a revised Level 3 (dollars averted) calculation was performed. The benefits were increased by a factor of 1.3 for Unit 2 and by a factor of 1.6 for Unit 3 to account for benefits in external events.

The staff has reviewed Dominion's bases for calculating the risk reduction for the various plant improvements and concludes that the rationale and assumptions for estimating risk reduction are reasonable and generally conservative (i.e., the estimated risk reduction is higher than what would actually be realized). Accordingly, the staff based its estimates of averted risk for the various SAMAs on Dominion's risk reduction estimates.

Dominion personnel experienced in estimating the cost of performing work at a nuclear plant estimated the costs of the remaining 44 SAMAs that were applicable to Unit 2 and the remaining 52 SAMAs that were applicable to Unit 3. For some of SAMAs considered, the cost estimates were sufficiently greater than the benefits calculated that it was not necessary to perform a detailed cost estimate. Cost estimates typically included procedures, engineering analysis, training, and documentation, in addition to any hardware.

The staff reviewed the bases for the applicant's cost estimates (presented in Section F.3 of Appendix F to the ER). For certain improvements, the staff also compared the cost estimates to estimates developed elsewhere for similar improvements, including estimates developed as part of other licensees' analyses of SAMAs for operating reactors and advanced light-water reactors. The cost estimates provided were in the form of ranges. For purposes of evaluating specific SAMAs, the staff selected the low-end values from the range to represent the costs. For some SAMAs, the costs appeared to be overestimated. Therefore, the staff asked the applicant to justify the costs for those SAMAs that had significant benefits (NRC 2004). In response to the staff's request, Dominion provided a discussion of the components and activities that were considered in estimating the costs of those SAMAs for which the benefit was determined to be $50,000 or more. The discussion included a description of the modification, if any procedure changes and training would be required, and if any new instrumentation and maintenance would be required (Dominion 2004b). The staff reviewed the costs and subsequent explanations and found them to be reasonable and generally consistent with estimates provided in support of other plants' analyses.

The staff concludes that the cost estimates provided by Dominion are sufficient and adequate for use in the SAMA evaluation.

5.2.5 Cost-Benefit Comparison

The cost-benefit analysis performed by Dominion was based primarily on NUREG/BR-0184 (NRC 1997b) and was executed consistent with this guidance. Sensitivity calculations were conducted to examine the potential impact of uncertainties, discount rates other than seven percent, and several parameters and assumptions involved in the severe accident dose calculations. None of these sensitivity calculations altered the results of the cost-benefit comparisons.

For Unit 2, Dominion identified one cost-beneficial SAMA:

SAMA 3: Enhance loss of RBCCW procedure to ensure cool down of RCS prior to seal LOCA. The resolution of this issue is expected to be either a new procedure or a procedure modification that will require actions to prevent or mitigate a seal LOCA upon loss of RBCCW.

As stated in the ER, Dominion is addressing SAMA 3 as part of a comprehensive industry initiative in response to Generic Safety Issue 23, "Reactor Coolant Pump Seal Failure." The

SAMA is being addressed as a current operating license issue and is anticipated to be implemented before the period of extended operation (Dominion 2004a).

In response to an RAI, Dominion assessed the applicability and feasibility for Unit 2 of several SAMAs considered by another Combustion Engineering plant. As a result, Dominion eliminated all of the SAMAs in question except one—adding a capability to flash the field on the emergency diesel generator (EDG) using a portable generator to enhance SBO event recovery. Dominion stated that this SAMA is not expected to be cost beneficial because it would likely require a plant modification to install a disconnect to allow the connection of a portable generator, as well as development of a new SAMG. However, Dominion stated that if this SAMA can be accomplished via a SAMG without a hardware modification, the SAMA could be cost-beneficial and will be implemented prior to the period of extended operation (Dominion 2004b).

For Unit 3, Dominion identified no cost-beneficial SAMAs. In response to an RAI regarding the costs of SAMA 112 (proceduralize local manual operation of AFW when control power is lost), Dominion assessed the applicability and feasibility of a procedure for manual operation of the turbine-driven AFW pump when control power is lost. Dominion stated that this SAMA would likely require a plant modification to provide the level indication that would be necessary during SBO, in addition to a new procedure. However, Dominion stated that if this SAMA can be accomplished via a SAMG, without a hardware modification, then the SAMA could be cost beneficial and will be implemented prior to the period of extended operation (Dominion 2004b).

The staff concludes that, with the exception of the one cost-beneficial SAMA (SAMA 3 for Unit 2) and the two SAMAs that would be cost-beneficial if they can be implemented by SAMG changes without hardware modifications, the costs of the SAMAs would be higher than the associated benefits. This conclusion is supported by uncertainty assessment and sensitivity analysis.

5.2.6 Conclusions

The staff reviewed the Dominion analyses and concluded that the methods used and the implementation of those methods were sound. The treatment of SAMA benefits and costs, the generally large negative net benefits, and the inherently small baseline risks support the general conclusion that the SAMA evaluations performed by Dominion are reasonable and sufficient for the license renewal submittal.

Based on its review of the Dominion SAMA analysis, the staff concludes that none of the candidate SAMAs are cost-beneficial, except for SAMA 3 for Unit 2. Two additional SAMAs, one SAMA involving adding a capability to flash the field on the EDG using a portable generator to enhance SBO event recovery on Unit 2 and SAMA 112 (proceduralize local manual operation of AFW when control power is lost) on Unit 3, are potentially cost beneficial if they can be implemented by a SAMG without hardware modifications. This is based on conservative treatment of costs and benefits. This conclusion is consistent with the low residual level of risk indicated in the PRA for both units and the fact that Millstone has already implemented many of the plant improvements identified from the IPE and IPEEE processes.

Dominion plans to implement SAMA 3 on Unit 2 before the period of extended operation (Dominion 2004a). The other two SAMAs will be implemented prior to the period of extended operation if they can be accomplished as discussed above (Dominion 2004b). None of these SAMAs relate to adequately managing the effects of aging during the period of extended operation. Therefore, they need not be implemented as part of license renewal pursuant to 10 CFR Part 54.

5.3 References

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

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

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

10 CFR Part 100. Code of Federal Regulations, Title 10, *Energy*, Part 100, "Reactor Site Criteria."

Dominion Nuclear Connecticut, Inc. (Dominion). 2004a. *Applicant's Environmental Report–Operating License Renewal Stage, Millstone Power Station, Units 2 and 3.* Dominion Nuclear Connecticut, Inc., Richmond, Virginia. January 2004.

Dominion Nuclear Connecticut, Inc. (Dominion). 2004b. Letter from Leslie N. Hartz, Dominion, to United States Nuclear Regulatory Commission (NRC) Document Control Desk. Subject: Millstone Power Station, Units 2 and 3, Response to Request for Additional Information, License Renewal Applications. (August 13, 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). 1997a. *Individual Plant Examination Program: Perspectives on Reactor Safety and Plant Performance.* NUREG-1560, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 1997b. *Regulatory Analysis Technical Evaluation Handbook.* NUREG/BR-0184, 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. NUREG-1437, Volume 1, Addendum 1, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 2004. Letter from Richard L. Emch, Jr., NRC, to David A. Christian, Dominion. Subject: Request for Additional Information (RAI) Regarding Severe Accident Mitigation Alternatives for the Millstone Power Station, Units 2 and 3 (TAC NOS. MC1827 and MC1828). (June 22, 2004).

6.0 Environmental Impacts of the Uranium Fuel Cycle and Solid-Waste Management

Environmental issues associated with the uranium fuel cycle and solid-waste management are discussed in the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2 (U.S. Nuclear Regulatory Commission [NRC] 1996; 1999.)[a] 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 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 offsite 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.

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 that are related to the uranium fuel cycle and solid-waste management during the license renewal term, which are listed in Table B-1 of 10 Code of Federal Regulations (CFR) Part 51, Subpart A, Appendix B, and are applicable to Millstone Power Station, Units 2 and 3 (Millstone). The generic potential impacts of the radiological and nonradiological environmental impacts of the uranium fuel cycle and transportation of nuclear fuel and wastes are described in detail in the GEIS based, in part, on the generic impacts provided in 10 CFR 51.51(b), Table S-3, "Table of Uranium Fuel Cycle Environmental Data," and in 10 CFR 51.52(c), Table S-4, "Environmental Impact of Transportation of Fuel and Waste

(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.

to and from One Light-Water-Cooled Nuclear Power Reactor." The staff also addresses the impacts from radon-222 and technetium-99 in the GEIS.

6.1 The Uranium Fuel Cycle

Category 1 issues in 10 CFR Part 51, Subpart A, Appendix B, Table B-1 that are applicable to Millstone from the uranium fuel cycle and solid-waste management are listed in Table 6-1.

Table 6-1. Category 1 Issues Applicable to the Uranium Fuel Cycle and Solid-Waste Management During the Renewal Term

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Section
URANIUM FUEL CYCLE AND WASTE MANAGEMENT	
Offsite radiological impacts (individual effects from other than the disposal of spent fuel and high-level waste)	6.1; 6.2.1; 6.2.2.1; 6.2.2.3; 6.2.3; 6.2.4; 6.6
Offsite radiological impacts (collective effects)	6.1; 6.2.2.1; 6.2.3; 6.2.4; 6.6
Offsite radiological impacts (spent fuel and high-level waste disposal)	6.1; 6.2.2.1; 6.2.3; 6.2.4; 6.6
Nonradiological impacts of the uranium fuel cycle	6.1; 6.2.2.6; 6.2.2.7; 6.2.2.8; 6.2.2.9; 6.2.3; 6.2.4; 6.6
Low-level waste storage and disposal	6.1; 6.2.2.2; 6.4.2; 6.4.3; 6.4.3.1; 6.4.3.2; 6.4.3.3; 6.4.4; 6.4.4.1; 6.4.4.2; 6.4.4.3; 6.4.4.4; 6.4.4.5; 6.4.4.5.1; 6.4.4.5.2; 6.4.4.5.3; 6.4.4.5.4; 6.4.4.6; 6.6
Mixed waste storage and disposal	6.1; 6.4.5.1; 6.4.5.2; 6.4.5.3; 6.4.5.4; 6.4.5.5; 6.4.5.6; 6.4.5.6.1; 6.4.5.6.2; 6.4.5.6.3; 6.4.5.6.4; 6.6
Onsite spent fuel	6.1; 6.4.6; 6.4.6.1; 6.4.6.2; 6.4.6.3; 6.4.6.4; 6.4.6.5; 6.4.6.6; 6.4.6.7; 6.6
Nonradiological waste	6.1; 6.5; 6.5.1; 6.5.2; 6.5.3; 6.6
Transportation	6.1; 6.3.1; 6.3.2.3; 6.3.3; 6.3.4; 6.6, Addendum 1

Dominion Nuclear Connecticut, Inc. (Dominion) stated in its Environmental Report (ER) (Dominion 2004) that it is not aware of any new and significant information associated with the

renewal of the Millstone operating licenses. The staff has not identified any significant new information during its independent review of the Dominion ER, the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. 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 would be SMALL except for the collective offsite radiological impacts from the fuel cycle and from HLW and spent fuel disposal, as discussed below, and that additional plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

A brief description of the staff review and the GEIS conclusions, as codified in Table B-1, 10 CFR Part 51, for each of these issues follows:

- Offsite radiological impacts (individual effects from other than the disposal of spent fuel and high-level waste). Based on information in the GEIS, the Commission found that

  > Off-site impacts of the uranium fuel cycle have been considered by the Commission in Table S-3 of this part [10 CFR 51.51(b)]. Based on information in the GEIS, impacts on individuals from radioactive gaseous and liquid releases including radon-222 and technetium-99 are small.

  The staff has not identified any new and significant information during its independent review of the Dominion ER (Dominion 2004), the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there are no offsite radiological impacts of the uranium fuel cycle during the renewal term beyond those discussed in the GEIS.

- Offsite radiological impacts (collective effects). Based on information in the GEIS, the Commission found that

  > The 100-year environmental dose commitment to the U.S. population from the fuel cycle, high-level waste and spent fuel disposal excepted, is calculated to be about 14,800 person-roentgen equivalents man (person-rem) (148 person-sieverts [person-Sv]), or 12 cancer fatalities, for each additional 20-year power reactor operating term. Much of this, especially the contribution of radon releases from mines and tailing piles, consists of tiny doses summed over large populations. This same dose calculation can theoretically be extended to include many tiny doses over additional thousands of years as well as doses outside the U.S. The result of such a calculation would be thousands of cancer fatalities from the fuel cycle, but this result assumes that even tiny doses have some statistical adverse health effect which will not ever be mitigated (for example no cancer cure in the next thousand years), and that these doses projected over thousands of years are meaningful. However,

> these assumptions are questionable. In particular, science cannot rule out the possibility that there will be no cancer fatalities from these tiny doses. For perspective, the doses are very small fractions of regulatory limits and even smaller fractions of natural background exposure to the same populations.
>
> Nevertheless, despite all the uncertainty, some judgement as to the regulatory National Environmental Policy Act of 1969 (NEPA) implications of these matters should be made and it makes no sense to repeat the same judgement in every case. Even taking the uncertainties into account, the Commission concludes that these impacts are acceptable in that these impacts would not be sufficiently large to require the NEPA conclusion, for any plant, that the option of extended operation under 10 CFR Part 54 should be eliminated. Accordingly, while the Commission has not assigned a single level of significance for the collective effects of the fuel cycle, this issue is considered Category 1.

The staff has not identified any new and significant information during its independent review of the Dominion ER (Dominion 2004), the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there are no offsite radiological impacts (collective effects) from the uranium fuel cycle during the renewal term beyond those discussed in the GEIS.

- Offsite radiological impacts (spent fuel and high-level waste disposal). Based on information in the GEIS, the Commission found that

> For the high-level waste and spent fuel disposal component of the fuel cycle, there are no current regulatory limits for offsite releases of radionuclides for the current candidate repository site. However, if we assume that limits are developed along the lines of the 1995 National Academy of Sciences (NAS) report, "Technical Bases for Yucca Mountain Standards," and that in accordance with the Commission's Waste Confidence Decision, 10 CFR 51.23, a repository can and likely will be developed at some site which will comply with such limits, peak doses to virtually all individuals will be 100 milliroentgen equivalents man (millirem) (1 millsievert [mSv]) per year or less. However, while the Commission has reasonable confidence that these assumptions will prove correct, there is considerable uncertainty since the limits are yet to be developed, no repository application has been completed or reviewed, and uncertainty is inherent in the models used to evaluate possible pathways to the human environment. The NAS report indicated that

100 millirem (1 mSv) per year should be considered as a starting point for limits for individual doses, but notes that some measure of consensus exists among national and international bodies that the limits should be a fraction of the 100 millirem (1 mSv) per year. The lifetime individual risk from 100 millirem (1 mSv) annual dose limit is about 3×10^{-3}.

Estimating cumulative doses to populations over thousands of years is more problematic. The likelihood and consequences of events that could seriously compromise the integrity of a deep geologic repository were evaluated by the Department of Energy in the "Final Environmental Impact Statement: Management of Commercially Generated Radioactive Waste," October 1980 [DOE 1980]. The evaluation estimated the 70-year whole-body dose commitment to the maximum individual and to the regional population resulting from several modes of breaching a reference repository in the year of closure, after 1,000 years, after 100,000 years, and after 100,000,000 years. Subsequently, the NRC and other federal agencies have expended considerable effort to develop models for the design and for the licensing of a high level waste repository, especially for the candidate repository at Yucca Mountain. More meaningful estimates of doses to population may be possible in the future as more is understood about the performance of the proposed Yucca Mountain repository. Such estimates would involve very great uncertainty, especially with respect to cumulative population doses over thousands of years. The standard proposed by the NAS is a limit on maximum individual dose. The relationship of potential new regulatory requirements, based on the NAS report, and cumulative population impacts has not been determined, although the report articulates the view that protection of individuals will adequately protect the population for a repository at Yucca Mountain. However, Environmental Protection Agency's (EPA) generic repository standards in 40 CFR part 191 generally provide an indication of the order of magnitude of cumulative risk to population that could result from the licensing of a Yucca Mountain repository, assuming the ultimate standards will be within the range of standards now under consideration. The standards in 40 CFR part 191 protect the population by imposing "containment requirements" that limit the cumulative amount of radioactive material released over 10,000 years. Reporting performance standards that will be required by EPA are expected to result in releases and associated health consequences in the range between 10 and 100 premature cancer deaths with an upper limit of 1,000 premature cancer deaths world-wide for a 100,000 metric tonne (MTHM) repository.

> Nevertheless, despite all the uncertainty, some judgement as to the regulatory NEPA implications of these matters should be made and it makes no sense to repeat the same judgement in every case. Even taking the uncertainties into account, the Commission concludes that these impacts are acceptable in that these impacts would not be sufficiently large to require the NEPA conclusion, for any plant, that the option of extended operation under 10 CFR part 54 should be eliminated. Accordingly, while the Commission has not assigned a single level of significance for the impacts of spent fuel and high level waste disposal, this issue is considered Category 1.

On February 15, 2002, based on a recommendation by the Secretary of the Department of Energy, the President recommended the Yucca Mountain site for the development of a repository for the geologic disposal of spent nuclear fuel and high-level nuclear waste. The U.S. Congress approved this recommendation on July 9, 2002, in Joint Resolution 87, which designated Yucca Mountain as the repository for spent nuclear waste. On July 23, 2002, the President signed Joint Resolution 87 into law; Public Law 107-200, 116 Stat. 735 (2002) designates Yucca Mountain as the repository for spent nuclear waste. This development does not represent new and significant information with respect to the offsite radiological impacts from license renewal related to disposal of spent nuclear fuel and high-level nuclear waste.

EPA developed Yucca Mountain-specific repository standards, which were subsequently adopted by the NRC in 10 CFR Part 63. In an opinion, issued July 9, 2004, the U.S. Court of Appeals for the District of Columbia Circuit (the Court) vacated EPA's radiation protection standards for the candidate repository, which required compliance with certain dose limits over a 10,000 year period. The Court's decision also vacated the compliance period in NRC's licensing criteria for the candidate repository in 10 CFR Part 63.

Therefore, for the high-level waste and spent fuel disposal component of the fuel cycle, there is some uncertainty with respect to regulatory limits for offsite releases of radioactive nuclides for the current candidate repository site. However, prior to promulgation of the affected provisions of the Commission's regulations, the NRC staff assumed that limits would be developed along the lines of the 1995 National Academy of Sciences report, "Technical Bases for Yucca Mountain Standards," and that in accordance with the Commission's Waste Confidence Decision, 10 CFR 51.23, a repository that would comply with such limits could and likely would be developed at some site. Peak doses to virtually all individuals will be 1mSv (100 mrem) per year or less.

Despite the current uncertainty with respect to these rules, some judgment as to the regulatory NEPA implications of offsite radiological impacts of spent fuel and high-level waste disposal should be made. The staff concludes that these impacts are acceptable in that the impacts

would not be sufficiently large to require the NEPA conclusion that the option of extended operation under 10 CFR Part 54 should be eliminated.

The staff has not identified any new and significant information during its independent review of the Dominion ER (Dominion 2004), the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there are no offsite radiological impacts related to spent fuel and HLW disposal during the renewal term beyond those discussed in the GEIS.

- Nonradiological impacts of the uranium fuel cycle. Based on information in the GEIS, the Commission found that

  > The nonradiological impacts of the uranium fuel cycle resulting from the renewal of an operating license for any plant are found to be small.

  The staff has not identified any new and significant information during its independent review of the Dominion ER (Dominion 2004), the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no nonradiological impacts of the uranium fuel cycle during the renewal term beyond those discussed in the GEIS.

- Low-level waste storage and disposal. Based on information in the GEIS, the Commission found that

  > The comprehensive regulatory controls that are in place and the low public doses being achieved at reactors ensure that the radiological impacts to the environment will remain small during the term of a renewed license. The maximum additional on-site land that may be required for low-level waste storage during the term of a renewed license and associated impacts will be small. Nonradiological impacts on air and water will be negligible. The radiological and nonradiological environmental impacts of long-term disposal of low-level waste from any individual plant at licensed sites are small. In addition, the Commission concludes that there is reasonable assurance that sufficient low-level waste disposal capacity will be made available when needed for facilities to be decommissioned consistent with NRC decommissioning requirements.

  The staff has not identified any new and significant information during its independent review of the Dominion ER (Dominion 2004), the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts of low-level waste storage and disposal associated with the renewal term beyond those discussed in the GEIS.

- Mixed waste storage and disposal. Based on information in the GEIS, the Commission found that

  > The comprehensive regulatory controls and the facilities and procedures that are in place ensure proper handling and storage, as well as negligible doses and exposure to toxic materials for the public and the environment at all plants. License renewal will not increase the small, continuing risk to human health and the environment posed by mixed waste at all plants. The radiological and nonradiological environmental impacts of long-term disposal of mixed waste from any individual plant at licensed sites are small. In addition, the Commission concludes that there is reasonable assurance that sufficient mixed waste disposal capacity will be made available when needed for facilities to be decommissioned consistent with NRC decommissioning requirements.

  The staff has not identified any new and significant information during its independent review of the Dominion ER (Dominion 2004), the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts of mixed waste storage and disposal associated with the renewal term beyond those discussed in the GEIS.

- Onsite spent fuel. Based on information in the GEIS, the Commission found that

  > The expected increase in the volume of spent fuel from an additional 20 years of operation can be safely accommodated on site with small environmental effects through dry or pool storage at all plants if a permanent repository or monitored retrievable storage is not available.

  The staff has not identified any new and significant information during its independent review of the Dominion ER (Dominion 2004), the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts of onsite spent fuel associated with license renewal beyond those discussed in the GEIS.

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

  > No changes to generating systems are anticipated for license renewal. Facilities and procedures are in place to ensure continued proper handling and disposal at all plants.

The staff has not identified any new and significant information during its independent review of the Dominion ER (Dominion 2004), the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no nonradiological waste impacts during the renewal term beyond those discussed in the GEIS.

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

  > The impacts of transporting spent fuel enriched up to 5 percent uranium-235 with average burnup for the peak rod to current levels approved by NRC up to 62,000 MWd/MTU and the cumulative impacts of transporting high-level waste to a single repository, such as Yucca Mountain, Nevada, are found to be consistent with the impact values contained in 10 CFR 51.52(c), Summary Table S-4—Environmental Impact of Transportation of Fuel and Waste to and from One Light-Water-Cooled Nuclear Power Reactor. If fuel enrichment or burnup conditions are not met, the applicant must submit an assessment of the implications for the environmental impact values reported in § 51.52.

  Millstone meets the fuel-enrichment and burnup conditions set forth in Addendum 1 to the GEIS. The staff has not identified any new and significant information during its independent review of the Dominion ER (Dominion 2004), the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no impacts of transportation associated with license renewal beyond those discussed in the GEIS.

There are no Category 2 issues for the uranium fuel cycle and solid-waste management.

6.2 References

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

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

10 CFR Part 63. Code of Federal Regulations, Title 10, *Energy,* Part 63, "Disposal of High-Level Radioactive Wastes in a Geologic Repository at Yucca Mountain, Nevada."

40 CFR Part 191. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 191, "Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Waste."

40 CFR Part 197. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 197, "Public Health and Environmental Radiation Protection Standards for Management and Disposal for Yucca Mountain, Nevada."

Dominion Nuclear Connecticut, Inc. (Dominion). 2004. *Applicant's Environmental Report—Operating License Renewal Stage Millstone Power Station, Units 2 and 3.* Waterford, Connecticut.

Energy Policy Act of 1992. 42 USC 10101, et seq.

National Academy of Sciences (NAS). 1995. *Technical Bases for Yucca Mountain Standards.* Washington, D.C.

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

Nuclear Energy Institute, Inc. v. EPA. 2004. No. 01-1258. U.S. Court of Appeals for the District of Columbia Circuit.

U.S. Department of Energy (DOE). 1980. *Final Environmental Impact Statement: Management of Commercially Generated Radioactive Waste.* DOE/EIS-0046F. Washington, D.C.

U.S. Environmental Protection Agency (EPA). 2001. "Public Health and Environmental Radiation Protection Standards for Yucca Mountain, NV." *Federal Register*, Vol. 66, No. 114, pp. 32074–32135. Washington, D.C. June 13, 2001.

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). 2001. "Disposal of High-Level Radioactive Wastes in a Geologic Repository at Yucca Mountain, Nevada." *Federal Register.* Vol. 66, No. 213, pp.55792–55815. November 2, 2001.

7.0 Environmental Impacts of Decommissioning

Environmental impacts from the activities associated with the decommissioning of any reactor before or at the end of an initial or renewed license are evaluated in the *Generic Environmental Impact Statement for Decommissioning of Nuclear Facilities*, NUREG-0586, Supplement 1 (NRC 2002). The staff's evaluation of the environmental impacts of decommissioning presented in Supplement 1 resulted in a range of impacts for each environmental issue. These results may be used by licensees as a starting point for a plant-specific evaluation of the decommissioning impacts at their facilities.

The incremental environmental impacts associated with decommissioning activities resulting from continued plant operation during the renewal term are evaluated in the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2 (U. S. Nuclear Regulatory Commission [NRC] 1996; 1999).[(a)] The evaluation in NUREG-1437 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 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. There are no Category 2 issues related to decommissioning.

(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.

7.1 Decommissioning

Category 1 issues in Table B-1 of 10 Code of Federal Regulations (CFR) Part 51, Subpart A, Appendix B that are applicable to Millstone, Units 2 and 3 (Millstone), decommissioning following the renewal term are listed in Table 7-1. Dominion Nuclear Connecticut, Inc. (Dominion) stated in its Environmental Report (ER) (Dominion 2004) that it is aware of no new and significant information regarding the environmental impacts of Millstone license renewal. The staff has not identified any significant new information during its independent review of the Dominion ER (Dominion 2004), the staff's site visit, the scoping process, its evaluation of other available information, or public comments on the draft SEIS. Therefore, the staff concludes that there are no impacts related to these issues beyond those discussed in the GEIS. For all of these issues, the staff concluded in the GEIS that the impacts would be SMALL, and additional plant-specific mitigation measures are not likely to be sufficiently beneficial to be warranted.

Table 7-1. Category 1 Issues Applicable to the Decommissioning of Millstone, Units 2 and 3 Following the Renewal Term

ISSUE—10 CFR Part 51, Subpart A, Appendix B, Table B-1	GEIS Section
DECOMMISSIONING	
Radiation Doses	7.3.1; 7.4
Waste Management	7.3.2; 7.4
Air Quality	7.3.3; 7.4
Water Quality	7.3.4; 7.4
Ecological Resources	7.3.5; 7.4
Socioeconomic Impacts	7.3.7; 7.4

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

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

  > Doses to the public will be well below applicable regulatory standards regardless of which decommissioning method is used. Occupational doses would increase no more than 1 man-rem [0.01 person-Sv] caused by buildup of long-lived radionuclides during the license renewal term.

The staff has not identified any new and significant information during its independent review of the Dominion ER (Dominion 2004), the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there are no radiation dose impacts associated with decommissioning following the license renewal term beyond those discussed in the GEIS.

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

  > Decommissioning at the end of a 20-year license renewal period would generate no more solid wastes than at the end of the current license term. No increase in the quantities of Class C or greater than Class C wastes would be expected.

  The staff has not identified any new and significant information during its independent review of the Dominion ER (Dominion 2004), the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there are no impacts from solid waste associated with decommissioning following the license renewal term beyond those discussed in the GEIS.

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

  > Air quality impacts of decommissioning are expected to be negligible either at the end of the current operating term or at the end of the license renewal term.

  The staff has not identified any new and significant information during its independent review of the Dominion ER (Dominion 2004), the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there are no impacts on air quality associated with decommissioning following the license renewal term beyond those discussed in the GEIS.

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

  > The potential for significant water quality impacts from erosion or spills is no greater whether decommissioning occurs after a 20-year license renewal period or after the original 40-year operation period, and measures are readily available to avoid such impacts.

  The staff has not identified any new and significant information during its independent review of the Dominion ER (Dominion 2004), the staff's site visit, the scoping process, its

evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there are no impacts on water quality associated with decommissioning following the license renewal term beyond those discussed in the GEIS

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

  > Decommissioning after either the initial operating period or after a 20-year license renewal period is not expected to have any direct ecological impacts.

  The staff has not identified any new and significant information during its independent review of the Dominion ER (Dominion 2004), the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there are no impacts on ecological resources associated with decommissioning following the license renewal term beyond those discussed in the GEIS.

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

  > Decommissioning would have some short-term socioeconomic impacts. The impacts would not be increased by delaying decommissioning until the end of a 20-year relicense period, but they might be decreased by population and economic growth.

  The staff has not identified any new and significant information during its independent review of the Dominion ER (Dominion 2004), the staff's site visit, the scoping process, its evaluation of other available information, and public comments on the draft SEIS. Therefore, the staff concludes that there would be no socioeconomic impacts associated with decommissioning following the license renewal term beyond those discussed in the GEIS.

7.2 References

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

Dominion Nuclear Connecticut, Inc. (Dominion). 2004. *Applicant's Environmental Report—Operating License Renewal Stage Millstone Power Station, Units 2 and 3.* Waterford, Connecticut.

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). 2002. *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities, Supplement 1, Regarding the Decommissioning of Nuclear Power Reactors.* NUREG-0586, Supplement 1, Volumes 1 and 2, Washington, D.C.

8.0 Environmental Impacts of Alternatives to License Renewal

This chapter examines the potential environmental impacts associated with denying the renewal of an operating license (OL) (i.e., the no-action alternative); the potential environmental impacts from electric generating sources other than Millstone Power Station, Units 2 and 3 (Millstone); the possibility of purchasing electric power from other sources to replace power generated by Millstone and the associated environmental impacts; the potential environmental impacts from a combination of generating and conservation measures; and other generation alternatives that were deemed unsuitable for replacement of power generated by Millstone. The environmental impacts are evaluated using the U.S. Nuclear Regulatory Commission's (NRC's) three-level standard of significance—SMALL, MODERATE, or LARGE—developed using the Council on Environmental Quality guidelines and set forth in the footnotes to Table B-1 of 10 Code of Federal Regulations (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.

The impact categories evaluated in this chapter are the same as those used in the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS) NUREG-1437, Volumes 1 and 2 (NRC 1996; 1999)[(a)] with the additional impact category of environmental justice.

8.1 No-Action Alternative

The NRC's regulations implementing the National Environmental Policy Act of 1969 specify that the no-action alternative be discussed in an NRC environmental impact statement (EIS) (see 10 CFR Part 51, Subpart A, Appendix A[4]). For license renewal, the no-action alternative refers to a scenario in which the NRC would not renew the Millstone OLs and Dominion Nuclear

(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.

Connecticut, Inc. (Dominion) would then cease plant operations by the end of the current licenses and initiate the decommissioning of the plants.

Dominion will be required to shut down Millstone and to comply with NRC decommissioning requirements in 10 CFR 50.82 whether or not the OLs are renewed. If the Millstone OLs are renewed and Dominion continues to operate Millstone during the renewal period, shutdown of the units and decommissioning activities will not be avoided, but will be postponed for up to an additional 20 years.

The environmental impacts associated with decommissioning following a license renewal period of up to 20 years or following the no-action alternative would be bounded by the discussion of impacts in Chapter 7 of the license renewal GEIS (NRC 1996), Chapter 7 of this supplemental environmental impact statement (SEIS), and the *Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities*, NUREG-0586, Supplement 1 (NRC 2002). The impacts of decommissioning after 60 years of operation are not expected to be significantly different from those occurring after 40 years of operation.

Impacts from the decision to permanently cease operations are not considered in NUREG-0586, Supplement 1.[(a)] Therefore, immediate impacts that occur between plant shutdown and the beginning of decommissioning are considered here. These impacts will occur when the units shut down regardless of whether the licenses are renewed and are discussed below, with the results presented in Table 8-1. Plant shutdown will result in a net reduction in power production capacity. The power not generated by Millstone during the license renewal term would likely be replaced by (1) power purchased from other electricity providers, (2) generating alternatives other than Millstone, (3) demand-side management and energy conservation, or (4) some combination of these options. The environmental impacts of these options are discussed in Section 8.2.

- **Land Use**

  In Chapter 4, the staff concluded that the impacts of continued plant operation on land use would be SMALL. Onsite land use will not be affected immediately by the cessation of operations. Plant structures and other facilities are likely to remain in place until decommissioning. The transmission lines associated with the project are expected to

(a) Appendix J of NUREG-0586 Supplement 1 discusses the socioeconomic impacts of plant closure, but the results of the analysis in Appendix J are not incorporated in the analysis presented in the main body of the NUREG.

Table 8-1. Summary of Environmental Impacts of the No-Action Alternative

Impact Category	Impact	Comment
Land Use	SMALL	Impacts are expected to be SMALL because plant shutdown is not expected to result in changes in onsite or offsite land use.
Ecology	SMALL	Impacts are expected to be SMALL because aquatic impacts are generally positive and terrestrial impacts are not expected because there will not be any land use changes.
Water Use and Quality—Surface Water	SMALL	Impacts are expected to be SMALL because surface water intake and discharges will decrease.
Water Use and Quality—Groundwater	SMALL	Impacts are expected to be SMALL because groundwater use will decrease.
Air Quality	SMALL	Impacts are expected to be SMALL because discharges related to plant operation and worker transportation will decrease.
Waste	SMALL	Impacts are expected to be SMALL because generation of high-level waste will stop, and generation of low-level and mixed waste will decrease.
Human Health	SMALL	Impacts are expected to be small because radiological doses to workers and members of the public, which are within regulatory limits, will be reduced.
Socioeconomics	SMALL to MODERATE	Impacts are expected to be SMALL to MODERATE because of a decrease in employment and tax revenues.
Socioeconomics (Transportation)	SMALL	Impacts are expected to be SMALL because of the decrease in employment would reduce traffic.
Aesthetics	SMALL	Impacts are expected to SMALL because plant structures will remain in place.
Historic and Archaeological Resources	SMALL	Impacts are expected to be SMALL because shutdown of the plant will not change land use.
Environmental Justice	SMALL	Impacts are expected to be SMALL because very few minority / low-income persons live in the immediate vicinity of Millstone. Economic offset likely is due to the general size and availability of other employment opportunities in the region.

remain in service after the plants stop operating. As a result, maintenance of the rights-of-way will continue as before. Therefore, the staff concludes that the impacts on land use from plant shutdown would be SMALL.

- **Ecology**

In Chapter 4 of this SEIS, the NRC staff concluded that the terrestrial and aquatic resource impacts of plant operation would be SMALL, with the exception of entrainment, which would likely be MODERATE. Cessation of operations will be accompanied by a significant reduction in cooling water flow, elimination of any impact due to impingement, entrainment, and the thermal plume. The environmental impacts to aquatic species, including threatened and endangered species, associated with these changes are generally positive. The impact of plant closure would be to cease the impacts due to entrainment. The impact of plant closure on the terrestrial ecosystem will be negligible because the transmission lines to the plant will be maintained and remain energized. Therefore, the staff concludes that ecological impacts from shutdown of the plant would be SMALL.

- **Water Use and Quality—Surface Water**

In Chapter 4 of this SEIS, the NRC staff concluded that impacts of plant operation on surface water use and quality would be SMALL. When the plant stops operating, there will be an immediate reduction in the consumptive use of water because of reduction in cooling water flow and in the amount of heat rejected to the Niantic Bay. There will also be a significant reduction in biocide use. Therefore, the staff concludes that the impacts on surface water use and quality from plant shutdown would be SMALL.

- **Water Use and Quality—Groundwater**

In Chapter 4, the staff concluded that impacts of plant ground-water use on ground-water availability and quality would be SMALL. The staff assumed that the ground-water wells would continue to be used for activities not related to operation of Millstone (e.g., watering of baseball fields). Therefore, the staff concludes that ground-water use and quality impacts from shutdown of the plant would be SMALL.

- **Air Quality**

In Chapter 4, the staff found the impacts of plant operation on air quality to be SMALL. When the plant stops operating, there will be a reduction in emissions from activities related

to plant operation such as use of diesel generators and workers' transportation. Therefore, the staff concludes that the impact on air quality from shutdown of the plant would be SMALL.

- **Waste**

  The impacts of waste generated by plant operation are discussed in Chapter 6. The impacts of low-level and mixed waste from plant operation are characterized as SMALL. When the plant stops operating, the plant will stop generating high-level waste, and generation of low-level and mixed waste associated with plant operation and maintenance will be reduced. Therefore, the staff concludes that the impact of waste generated after shutdown of the plant would be SMALL.

- **Human Health**

  In Chapter 4 of this SEIS, the NRC staff concluded that the impacts of plant operation on human health would be SMALL. After the cessation of operations, the amount of radioactive material released to the environment in gaseous and liquid forms will be reduced. Therefore, the staff concludes that the impact of shutdown of the plant on human health will be SMALL. In addition, the variety of potential accidents at the plant will be reduced to a limited set associated with shutdown events and fuel handling. In Chapter 5 of this SEIS, the NRC staff concluded that the impacts of accidents during operation would be SMALL. Therefore, the staff concludes that the impacts of potential accidents following shutdown of the plant would be SMALL.

- **Socioeconomics**

  In Chapter 4, the NRC staff concluded that the socioeconomic impacts of continued plant operation would be SMALL. There would be immediate socioeconomic impacts associated with the shutdown of the plant because of the reduction in the staff at the plant. There may also be an immediate reduction in property tax revenues for the town of Waterford. The NRC staff concludes that the socioeconomic impacts of plant shutdown would range from SMALL to MODERATE. Some of these impacts could be offset if new power generating facilities are built at or near the current site. See Appendix J to NUREG-0586, Supplement 1 (NRC 2002), for additional discussion of the potential socioeconomic impacts of plant shutdown.

- **Socioeconomics (Transportation)**

  In Chapter 4, the staff concluded that the impacts of continued plant operation on transportation would be SMALL. Cessation of operations will be accompanied by a

reduction in traffic in the vicinity of the plant. Most of the reduction will be associated with a reduction in the plant workforce, but there will also be a reduction in shipment of material to and from the plant. Therefore, the staff concludes that the impacts of plant closure on transportation would be SMALL.

- **Aesthetics**

  In Chapter 4, the staff concluded that the aesthetic impacts of continued plant operation would be SMALL. Cessation of plant operations would probably result in the dismantlement of buildings and structures at the site, resulting in a positive aesthetic impact. Operational noise would be reduced or eliminated. Decommissioning would result in the eventual dismantlement of buildings and structures at the site, resulting in a positive aesthetic impact. Noise would be generated during decommissioning operations that may be detectable off site; however, the impact is unlikely to be of large significance and can normally be mitigated. Thus, the aesthetic impacts associated with the no-action alternative and decommissioning would be considered SMALL.

- **Historic and Archaeological Resources**

  In Chapter 4, the staff concluded that the impacts of continued plant operation on historic and archaeological resources would be SMALL. Onsite land use will not be affected immediately by the cessation of operations. Plant structures and other facilities are likely to remain in place until decommissioning. The transmission lines associated with the project are expected to remain in service after the plants stop operating. As a result, maintenance of transmission line rights-of-way (ROWs) will continue as before. Therefore, the staff concludes that the impacts on historic and archaeological resources from plant shutdown would be SMALL.

- **Environmental Justice**

  In Chapter 4, the staff concluded that the environmental justice impact of continued operation of the plant would be SMALL because continued operation of the plant would not have a disproportionately high and adverse impact on minority and low-income populations. Shutdown of the plant could have disproportionately high and adverse impacts on minority and low-income populations because of the loss of employment opportunities at the site and because of secondary socioeconomic impacts (e.g., loss of patronage at local businesses). However, some of these impacts could be offset if new power generating facilities are built at or near the current site. The staff concludes that the environmental justice impacts of plant shutdown would be SMALL. See Appendix J to NUREG-0586, Supplement 1 (NRC 2002), for additional discussion of these impacts.

8.2 Alternative Energy Sources

This section discusses the environmental impacts associated with alternative sources of electric power to replace the power generated by Millstone, assuming that the OLs for Units 2 and 3 are not renewed. The order of presentation of alternative energy sources in Section 8.2 does not imply which alternative would be most likely to occur or to have the least environmental impacts.

The following generation alternatives are considered in detail:

- coal-fired generation at the Millstone site and an alternate retired oil-fired plant site (Section 8.2.1);
- natural gas-fired generation at the Millstone site and an alternate retired oil-fired plant site (Section 8.2.2); and
- nuclear generation at the Millstone site and an alternate retired oil-fired plant site (Section 8.2.3).

The alternative of purchasing power from other sources to replace power generated at Millstone is discussed in Section 8.2.4. Other power-generation alternatives and conservation alternatives considered by the staff and found not to be reasonable replacements for Units 2 and 3 are discussed in Section 8.2.5. Section 8.2.6 discusses the environmental impacts of a combination of generation and conservation alternatives.

Each year the Energy Information Administration (EIA), a component of the U.S. Department of Energy (DOE), issues an Annual Energy Outlook. In its Annual Energy Outlook 2004, with Projections to 2025, EIA projects that combined-cycle[a] or combustion turbine technology fueled by natural gas is likely to account for approximately 62 percent of new electric generating capacity between the years 2011 and 2025 (DOE/EIA 2004a). Both technologies are designed primarily to supply peak and intermediate capacity, but combined-cycle technology can also be used to meet base-load[b] requirements. Coal-fired plants are projected by EIA to account for approximately 33 percent of new capacity during this period. Coal-fired plants are generally

(a) In a combined-cycle unit, hot combustion gas in a combustion turbine rotates the turbine to generate electricity. The hot exhaust from the combustion turbine is routed through a heat-recovery boiler to make steam to generate additional electricity.

(b) A base-load plant normally operates to supply all or part of the minimum continuous load of a system and, consequently, produces electricity at an essentially constant rate. Nuclear power plants are commonly used for base-load generation; i.e., these units generally run near full load.

used to meet base-load requirements. Renewable energy sources, primarily wind and biomass units, are projected by EIA to account for the remaining 5 percent of capacity additions. EIA's projections are based on the assumption that providers of new generating capacity will seek to minimize cost while meeting applicable environmental requirements. Combined-cycle plants are projected by EIA to have the lowest generation cost in 2010, followed by wind generation and then coal-fired plants (DOE/EIA 2004a). By 2025, coal-fired plants are projected by EIA to have the lowest generation cost, followed by combined-cycle plants and then wind generation (DOE/EIA 2004a).

EIA projects that oil-fired plants will account for very little of new generation capacity in the United States during the 2002 to 2025 time period because of higher fuel costs and lower efficiencies (DOE/EIA 2004a).

EIA also projects that new nuclear power plants will not account for any new generation capacity in the United States during the 2002 to 2025 time period because natural gas and coal-fired plants are projected to be more economical (DOE/EIA 2004a). In spite of this projection, a new nuclear plant alternative for replacing power generated by Millstone is considered for reasons stated in Section 8.2.3. NRC established a new reactor licensing program organization in 2001 to prepare for and manage future reactor and site licensing applications (NRC 2001).

Millstone Units 2 and 3 have a combined net calculated electrical output of approximately 2024 megawatts electric (MW[e]). The staff assumed construction of four 500-MW(e) units for the coal alternative and five 400-MW(e) units for the natural gas alternative, for a combined capacity of 2000 MW(e), which is consistent with Dominion's Environmental Report (ER) (Dominion 2004). For the nuclear alternative, the staff assumed construction of two 1000-MW(e) plants. This assumption will understate the environmental impacts of replacing the 2024 MW(e) from Millstone by roughly 1.2 percent.

The Dominion ER (Dominion 2004) identified the potential availability of retired oil-fired plant sites in Connecticut as locations for alternative energy production plants. A previously used site would not require construction of transmission lines or other support facilities and may not require construction of a rail spur. In addition, greenfield sites may not be a reasonable alternative because of the high population and limited amount of open space for this type of development. Therefore, greenfield sites are not considered in this analysis.

8.2.1 Coal-Fired Generation

The coal-fired alternative is analyzed for both the Millstone site and an alternate retired oil-fired plant site in Connecticut. Existing transmission lines, cooling systems, and support facilities

would be used (Dominion 2004). Millstone has an existing rail spur, although it may require some improvement if used for a coal-fired facility. The alternate sites may have rail access in place.

Unless otherwise indicated, the assumptions and numerical values used in Section 8.2.1 are from the Dominion ER (Dominion 2004). The staff reviewed this information and compared it to environmental impact information in the GEIS. Although the OL renewal period is only 20 years, the impact of operating the coal-fired alternative for 40 years is considered (as a reasonable projection of the operating life of a coal-fired plant).

The coal-fired plant would consume approximately 5.4 million metric tons (MT) (5.9 million tons) per year of pulverized bituminous coal with an ash content of approximately 4.85 percent (Dominion 2004). Dominion assumes a heat rate[(a)] of 9700 joules (J) of fuel /J of electricity (10,200 British thermal units per kilowatt hour [BTU/kWh]) and a capacity factor[(b)] of 0.85 in its ER (Dominion 2004). After combustion, 99.9 percent of the ash would be collected and disposed of at the plant site. In addition, approximately 170.5×10^3 MT (188.0×10^3 tons) of scrubber sludge would be disposed of at the plant site based on annual lime usage of approximately 58,000 MT (64,000 tons). Lime is used in the scrubbing process for control of sulfur dioxide (SO_2) emissions.

Coal and lime or limestone for a coal-fired plant sited at Millstone most likely would be delivered via rail line. Lime[(c)] or limestone is used in the scrubbing process for control of SO_2 emissions. Rail delivery also would be the most likely option for delivering coal and lime/limestone to an alternative site for the coal-fired plant. Construction at an alternative site could necessitate the construction of a rail spur to the plant. This would require construction of docking and loading facilities onsite.

8.2.1.1 Closed-Cycle Cooling System

The overall impacts at either the Millstone or at an alternate site of the coal-fired generating system using a closed-cycle cooling system with cooling towers are discussed in the following

(a) Heat rate is a measure of generating station thermal efficiency. In English units, it is generally expressed in British thermal units (BTUs) per net kilowatt-hour (kWh). It is computed by dividing the total BTU content of the fuel burned for electric generation by the resulting kWh generation. The corresponding metric unit for energy is the joule (J).

(b) The capacity factor is the ratio of electricity generated, for the period of time considered, to the energy that could have been generated at continuous full-power operation during the same period.

(c) In a typical wet scrubber, lime (calcium hydroxide) or limestone (calcium carbonate) is injected as a slurry into the hot effluent combustion gases to remove entrained sulfur dioxide. The lime-based scrubbing solution reacts with sulfur dioxide to form calcium sulfite which precipitates and is removed in sludge form.

sections and summarized in Table 8-2. The magnitude of impacts for the alternate site (retired oil-fired plant site) will depend on the location of the particular site selected. The Millstone plant currently uses a once-through cooling system. For the purposes of comparison with an alternate site, however, it is assumed that the replacement coal-fired plant sited on the Millstone site would use a closed-cycle cooling system, which would most likely require the acquisition of additional land adjacent to the site. For completeness, the staff also considered the impacts of a once-through cooling system, which are discussed in Section 8.2.1.2.

Table 8-2. Summary of Environmental Impacts of Coal-Fired Generation at Millstone Site and an Alternate Site Using Once-Through Cooling

	Millstone Site		Alternate Site	
Impact Category	**Impact**	**Comments**	**Impact**	**Comments**
Land Use	SMALL to MODERATE	Uses approximately 164 hectares (ha) (406 acres [ac]) for plant and waste disposal. Additional land may be required at Millstone. Additional offsite land impacts for coal and limestone mining. Additional impacts would occur for rail spur and closed-cycle cooling system towers.	SMALL to MODERATE	Uses approximately 700 ha (1700 ac), for plant, offices, parking, and rail spur. Additional land impacts for coal and limestone mining and cooling-water system.
Ecology	SMALL to MODERATE	Uses undeveloped areas at current Millstone site, additional land adjacent to Millstone site, plus rail corridor. Impacts to terrestrial ecology from cooling tower drift.	SMALL to MODERATE	Impact depends on location and ecology of the site and need for rail or barge facilities. Impacts to terrestrial ecology from cooling tower drift; impact to aquatic resources from surface water body used for intake and discharge.
Water Use and Quality—Surface Water	SMALL	Partial use of existing cooling system (e.g., intake and discharge structures). Operational impacts similar or less than Millstone Units 2 and 3.	SMALL to MODERATE	Impact will depend on the volume of water withdrawn and discharged and the characteristics of the surface water body.
Water Use and Quality—Groundwater	SMALL	Groundwater use is limited.	SMALL to MODERATE	Impact will depend on the volume of water withdrawn and discharged and the characteristics of the aquifers.

Table 8-2. (contd)

Impact Category	Millstone Site Impact	Millstone Site Comments	Alternate Site Impact	Alternate Site Comments
Air Quality	MODERATE	Sulfur oxides • 12,500 MT/yr (13,780 tons/yr) Nitrogen oxides • 4045 MT/yr (4459 tons/yr) Particulates • 131 MT/yr (144 tons/yr) of total PM_{10} particulates • 30 MT/yr (33 tons/yr) Carbon monoxide • 1348 MT/yr (1486 tons/yr) Small amounts of mercury and other hazardous air pollutants and naturally occurring radioactive materials — mainly uranium and thorium	MODERATE	Potentially same impacts as the Millstone site, although pollution-control standards may vary.
Waste	MODERATE	Total waste volume would be approximately 2.63×10^5 MT/yr (2.90×10^5 tons/yr) of ash and scrubber sludge requiring approximately 43 ha (106 ac) for disposal during the 40-year life of the plant.	MODERATE	Same impacts as Millstone site; waste disposal constraints may vary.
Human Health	SMALL	Impacts are uncertain, but considered SMALL in the absence of more quantitative data.	SMALL	Same impact as the Millstone site.
Socioeconomics	SMALL to MODERATE	During construction, impacts would be visible. Up to 2500 workers during the peak period of the five-year construction period, followed by reduction from current Millstone workforce of 1650 to 400; tax base preserved. Impacts during operation would be negligible.	SMALL to LARGE	Construction impacts depend on location, but could be significant if plant is located in an area that is more rural than the Millstone site. City of Waterford would experience loss of tax base and employment, potentially offset by possible economic growth.

Table 8-2. (contd)

	Millstone Site		Alternate Site	
Impact Category	**Impact**	**Comments**	**Impact**	**Comments**
Socioeconomics (Transportation)	SMALL to LARGE	Transportation impacts associated with construction workers could be noticeable to significant. Impacts could be slight to noticeable during operations. For rail transportation of coal and lime, the impact is considered noticeable to significant.	SMALL to LARGE	Transportation impacts associated with construction workers could be noticeable to significant. Impacts could be slight to noticeable during operation. For rail transportation of coal and lime, the impact is considered noticeable to significant.
Aesthetics	MODERATE	MODERATE aesthetic impact due to visual impact of cooling towers, exhaust stacks, and rail on environment. Noise impact would be SMALL to MODERATE due to proximity of houses.	SMALL to MODERATE	Impacts would depend on characteristics of alternate location.
Historic and Archeological Resources	SMALL to MODERATE	Some construction would affect previously developed parts of Millstone site; cultural resource inventory should minimize any impacts on undeveloped lands.	SMALL to MODERATE	Alternate location would necessitate cultural resource studies.
Environmental Justice	SMALL to MODERATE	Impacts on minority and low-income communities should be similar to those experienced by the population as a whole. Loss of 1250 operating jobs could reduce employment prospects for minority and low-income populations. Impacts could be offset by possible economic growth and the ability of affected workers to commute to other jobs.	SMALL to MODERATE	Impacts will vary depending on population distribution and make-up at the site.

- **Land Use**

The existing facilities and infrastructure at the Millstone site would be used to the extent practicable, limiting the amount of new construction that would be required. Specifically, the staff assumed that the coal-fired replacement plant alternative would use the once-through system, switchyard, offices, and transmission line ROWs. Much of the land that would be used has been previously disturbed.

The coal-fired generation alternative would necessitate converting roughly an additional 164 ha (406 ac) of the Millstone site for the plant, coal storage, and ash and scrubber sludge disposal. Additional land may be needed since the Millstone site is only 212 ha (525 ac) in size. Although the Millstone site has an existing once-through cooling system, it is likely that the system would need to be significantly modified to accommodate a coal plant with a closed-cycle cooling system (e.g., addition of cooling towers). Additional land-use changes would occur offsite in an undetermined coal-mining area to supply coal for the plant.

In the GEIS, the staff estimated that approximately 8900 ha (22,000 ac) would be affected for mining the coal and disposing of the waste to support a 1000 MW(e) coal plant during its operational life. Partially offsetting this offsite land use would be the elimination of the need for uranium mining to supply fuel for Millstone. In the GEIS, the staff estimated that approximately 400 ha (1000 ac) would be affected for mining the uranium and processing it during the operating life of a nuclear power plant.

The impact of a coal-fired generating unit on land use at the existing Millstone site is best characterized as SMALL to MODERATE. The impact would be expected to be greater than the OL renewal alternative.

Construction of the coal-fired plant at an alternate site could impact up to 700 ha (1700 ac) (NRC 1996). While transmission facilities would be available at a retired oil-fired plant site, additional land may be disturbed if a rail spur is needed for coal and lime delivery. This alternative would result in SMALL to MODERATE land-use impacts.

- **Ecology**

Locating a coal-fired plant at the Millstone site would alter ecological resources because of the need to convert roughly 164 ha (406 ac) of land to industrial use (plant, coal storage, ash and scrubber sludge disposal). Additional land may be needed since the Millstone site is only 212 ha (525 acres) in size. However, some of the land on the Millstone site and the surrounding area would have been previously disturbed. Therefore, the impacts to terrestrial resources would be considered inconsequential to detectable but not

destabilizing. Impacts to aquatic resources would likely be less than those resulting from the current Millstone operations even if the existing intake and discharge structures are used.

Locating a coal-fired plant at an alternate site would alter ecological resources because of the need to convert roughly up to 700 ha (1700 ac) (NRC 1996) of land to industrial use (plant, coal storage, ash and scrubber sludge disposal). Additional land may be disturbed if a rail spur is needed for coal and lime delivery. Impacts could include wildlife habitat loss, reduced productivity, and a local reduction in biological diversity. Cooling tower drift from the closed-cycle cooling system could impact terrestrial resources. If needed, construction and maintenance of a rail spur would have ecological impacts. Overall, the ecological impacts at the Millstone site or at an alternate site would be SMALL to MODERATE.

- **Water Use and Quality—Surface Water**

Coal-fired generation at the Millstone site would likely use water from Niantic Bay for cooling. It is possible that some of the existing intake and discharge structures could be used, but the construction of additional cooling infrastructure would be needed to accommodate a closed-cycle cooling system. Plant discharges would consist mostly of cooling tower blowdown, characterized primarily by an increased temperature and concentration of dissolved solids relative to the receiving water body and intermittent, low concentrations of biocides (e.g., chlorine). Sanitary waste would likely continue to be discharged into the water treatment system of the city of New London. Treated process waste streams and sanitary wastewater may also be discharged. All discharges would be regulated by the Connecticut Department of Environmental Protection (CTDEP) through a National Pollutant Discharge Elimination System permit. There would be a consumptive use of water due to evaporation from the cooling towers. Some erosion and sedimentation would likely occur during construction (NRC 1996). The staff considers the impacts to surface-water use and quality of a new coal-fired plant with a closed-cycle cooling system located at the Millstone site to be SMALL.

Cooling water at an alternate site would likely be withdrawn from a surface-water body and would be regulated by permit. Depending on the source water body, the impacts of water use for cooling system make-up water and the impacts on water quality due to cooling tower blowdown could have noticeable impacts. Therefore, the staff considers the impacts of a new coal-fired plant utilizing a closed-cycle cooling system at an alternate site to be SMALL to MODERATE. Water quality impact from sedimentation during construction was characterized in the GEIS as SMALL. The staff also noted in the GEIS that operational water-quality impacts would be similar to or less than those from other generating technologies. Sedimentation impacts from construction of a coal-fired plant at the Millstone site or at an alternate would be short-term and easily mitigated.

- **Water Use and Quality—Groundwater**

The staff assumed that the groundwater wells would continue to be used for non-Millstone related activities (e.g., watering of baseball fields) located adjacent to Millstone. Ground-water withdrawals would be equal to or less than the no-action and license renewal alternatives. Hence, impacts would be considered SMALL. Use of groundwater for a coal-fired plant located at an alternative site is a possibility. Ground-water withdrawals at an alternate site would likely require a permit from the state of Connecticut. The impacts will depend on the characteristics of the site and the amount of groundwater used. Therefore, the impacts would be considered SMALL to MODERATE.

- **Air Quality**

The air-quality impacts of coal-fired generation vary considerably from those of nuclear generation due to emissions of sulfur oxides (SO_x), nitrogen oxides (NO_x), particulates, carbon monoxide, hazardous air pollutants such as mercury, and naturally occurring radioactive materials.

Millstone is located in New London County, which is part of the Eastern Connecticut Intrastate Air Quality Control Region (40 CFR 81.183). The entire state of Connecticut has been designated as an attainment area for carbon monoxide, nitrogen dioxide, lead, and SO_2. New London County is also designated as in attainment for particulate matter with a diameter of 10 micrometers (μm) or less. New London County has been designated as serious nonattainment for the U.S. Environmental Protection Agency (EPA) one-hour ozone standard (40 CFR 81.307; CTDEP 2002a).

A new coal-fired generating plant located in Connecticut would need an operating permit under the Clean Air Act and would have to offset its emissions of NO_x and SO_x through the purchase of allowances (Dominion 2004). The plant would be required to comply with the new source performance standards for such plants set forth in 40 CFR Part 60, Subpart D(a). The standards establish limits for particulate matter and opacity (40 CFR 60.42[a]), SO_2 (40 CFR 60.43[a]), and NO_x (40 CFR 60.44[a]).

The EPA has various regulatory requirements for visibility protection in 40 CFR Part 51, Subpart P, including a specific requirement for review of any new major stationary source in an area designated as attainment or unclassified under the Clean Air Act. All of Connecticut is classified as attainment for criteria pollutants (40 CFR 81.310).

Section 169A of the Clean Air Act (42 United States Code [USC] 7491) establishes a national goal of preventing future and remedying existing impairment of visibility in

mandatory Class I Federal areas when impairment results from human made air pollution. EPA issued a new regional haze rule on July 1, 1999 (64 *Federal Register* (FR) 35714 [EPA 1999]). The rule specifies that for each mandatory Class I Federal area located within a state, the state must establish goals that provide for reasonable progress toward achieving natural visibility conditions. The reasonable progress goals must provide for an improvement in visibility for the most-impaired days over the period of the implementation plan and ensure no degradation in visibility for the least-impaired days over the same period [40 CFR 51.308(d)(1)]. If a coal-fired plant were located close to a mandatory Class I Federal area, additional air pollution control requirements could be imposed. There are no Class I areas in Connecticut.

In 1998, EPA issued a rule requiring 22 eastern states, including Connecticut, to revise their state implementation plans to reduce nitrogen oxide emissions. Nitrogen oxide emissions contribute to violations of the national ambient air quality standard for ozone. The total amount of nitrogen oxides that can be emitted by each of the 22 states in the year 2007 ozone season (May 1 to September 30) is set out at 40 CFR 51.121(e). For Connecticut, the amount is 38,870 MT (42,850 tons).

Impacts for particular pollutants are as follows:

Sulfur oxides emissions. Dominion states in its ER that an alternative coal-fired plant would use wet scrubber-lime for flue gas desulfurization (Dominion 2004).

A new coal-fired power plant would be subject to the requirements in Title IV of the Clean Air Act. Title IV was enacted to reduce emissions of SO_2 and NO_x, the two principal precursors of acid rain, by restricting emissions of these pollutants from power plants. Title IV caps aggregate annual power plant SO_2 emissions and imposes controls on SO_2 emissions through a system of marketable allowances. EPA issues one allowance for each ton of SO_2 that a unit is allowed to emit. New units do not receive allowances, but are required to have allowances to cover their SO_2 emissions. Owners of new units must therefore acquire allowances from owners of other power plants by purchase or reduce SO_2 emissions at other power plants they own. Allowances can be banked for use in future years. Thus, a new coal-fired power plant would not add to net regional SO_2 emissions, although it might do so locally.

Regardless, SO_2 emissions would be greater for the coal alternative than the OL renewal alternative.

Dominion estimates that, by using the best technology to minimize SO_x emissions, the total annual stack emissions would be approximately as high as 12,500 MT (13,780 tons) of SO_x (Dominion 2004).

Nitrogen oxides emissions. Section 407 of the Clean Air Act establishes technology-based emission limitations for NO_x emissions. The market-based allowance system used for SO_2 emissions is not used for NO_x emissions. A new coal-fired power plant would be subject to the new source performance standards for such plants at 40 CFR 60.44a(d)(1). This regulation, issued on September 16, 1998 (63 FR 49453 [EPA 1998]), limits the discharge of any gases that contain nitrogen oxides (expressed as NO_2) in excess of 200 nanograms per joule (ng/J) (1.6 pounds per megawatt hour [16 lb/MWh]) of gross energy output, based on a 30-day rolling average.

Dominion estimates that, by using NO_x burners with overfire air and selective catalytic reduction, the total annual NO_x emissions for a new coal-fired power plant would be approximately as high as 4045 MT (4459 tons) (Dominion 2004). This level of NO_x emissions would be greater than the level for the OL renewal alternative.

Particulate emissions. Dominion estimates that the total annual stack emissions would include 131 MT (144 tons) of filterable total suspended particulates and 30 MT (33 tons) of particulate matter having an aerodynamic diameter less than or equal to 10 µm (PM_{10}) (40 CFR 50.6). Fabric filters or electrostatic precipitators would be used for control. In addition, coal-handling equipment would introduce fugitive particulate emissions. Particulate emissions would be greater under the coal alternative than the OL renewal alternative.

During the construction of a coal-fired plant, fugitive dust would be generated. In addition, exhaust emissions would come from vehicles and motorized equipment used during the construction process.

Carbon monoxide emissions. Dominion estimates that the total carbon monoxide emissions would be approximately 1348 MT (1486 tons) per year. This level of emissions is greater than the level for the OL renewal alternative.

Hazardous air pollutants including mercury. In December 2000, EPA issued regulatory findings on emissions of hazardous air pollutants from electric utility steam generating units (EPA 2000a). EPA determined that coal- and oil-fired electric utility steam generating units are significant emitters of hazardous air pollutants. Coal-fired power plants were found by EPA to emit arsenic, beryllium, cadmium, chromium, dioxins, hydrogen chloride, hydrogen fluoride, lead, manganese, and mercury (EPA 2000a). EPA concluded that mercury is the hazardous air pollutant of greatest concern. EPA found that (1) there is a link between coal consumption and mercury emissions; (2) electric utility, steam generating units are the largest domestic source of mercury emissions; and (3) certain segments of the U.S. population (e.g., the developing fetus and subsistence fish-eating populations) are believed to be at potential risk of adverse health impacts due to mercury exposures

resulting from consumption of contaminated fish (EPA 2000a). Accordingly, EPA added coal- and oil-fired, electric utility, steam generating units to the list of source categories under Section 112(c) of the Clean Air Act for which emission standards for hazardous air pollutants will be issued (EPA 2000a).

Uranium and thorium. Coal contains uranium and thorium. Uranium concentrations are generally in the range of 1 to 10 parts per million. Thorium concentrations are generally about 2.5 times greater than uranium concentrations (Gabbard 1993). One estimate is that a typical coal-fired plant released roughly 4.7 MT (5.2 tons) of uranium and 11.6 MT (12.8 tons) of thorium in 1982 (Gabbard 1993). The population dose equivalent from the uranium and thorium releases and daughter products produced by the decay of these isotopes has been calculated to be significantly higher than that from nuclear power plants (Gabbard 1993).

Carbon dioxide. A coal-fired plant would also have unregulated carbon dioxide emissions that could contribute to global warming. The level of emissions from a coal-fired plant would be greater than the OL renewal alternative.

Summary. The GEIS analysis did not quantify emissions from coal-fired power plants, but implied that air impacts would be substantial. The GEIS also mentioned global warming from unregulated carbon dioxide emissions and acid rain from SO_x and NO_x emissions as potential impacts (NRC 1996). Adverse human health impacts such as cancer and emphysema have been associated with the products of coal combustion. The appropriate characterization of air impacts from coal-fired generation would be MODERATE. The impacts would be clearly noticeable, but would not destabilize air quality.

Siting a coal-fired generation plant at a site other than Millstone would not significantly change air-quality impacts, although it could result in installing more or less stringent pollution-control equipment to meet applicable local requirements. Therefore, the impacts would be MODERATE.

- **Waste**

Coal combustion generates waste in the form of ash, and equipment for controlling air pollution generates additional ash and scrubber sludge. Four 500-MW(e) coal-fired plants would generate approximately 2.63×10^5 MT (2.90×10^5 tons) of this waste annually for 40 years. The waste would be disposed of onsite, accounting for approximately 43 ha (106 ac) of land area over the 40-year plant life. Waste impacts to groundwater and surface water could extend beyond the operating life of the plant if leachate and runoff from the waste storage area occurs. Disposal of the waste could noticeably affect land use and ground-water quality, but with appropriate management and monitoring, it would not

destabilize any resources. After closure of the waste site and revegetation, the land could be available for other uses. Debris would be generated during construction activities.

In May 2000, EPA issued a "Notice of Regulatory Determination on Wastes From the Combustion of Fossil Fuels" (EPA 2000b). EPA concluded that some form of national regulation is warranted to address coal combustion waste products because of the following: (a) the composition of these wastes could present danger to human health and the environment under certain conditions; (b) EPA has identified 11 documented cases of proven damages to human health and the environment by improper management of these wastes in landfills and surface impoundments; (c) present disposal practices are such that, in 1995, these wastes were being managed in 40 percent to 70 percent of landfills and surface impoundments without reasonable controls in place, particularly in the area of ground-water monitoring; and (d) EPA identified gaps in state oversight of coal combustion wastes. Accordingly, EPA announced its intention to issue regulations for disposal of coal combustion waste under subtitle D of the Resource Conservation and Recovery Act.

For all of the preceding reasons, the appropriate characterization of impacts from waste generated from burning coal at the Millstone site is MODERATE; the impacts would be clearly noticeable, but would not destabilize any important resource.

Siting the facility at a site other than Millstone would not alter waste generation, although other sites might have more constraints on disposal locations. Therefore, the impacts would also be MODERATE.

- **Human Health**

Coal-fired power generation introduces worker risks from fuel and limestone mining, from fuel and lime / limestone transportation, and from disposal of coal combustion waste. In addition, there are public risks from inhalation of stack emissions. Emission impacts can be widespread and health risks difficult to quantify. The coal alternative also introduces the risk of coal-pile fires and attendant inhalation risks.

In the GEIS, the staff stated that there could be human health impacts (cancer and emphysema) from inhalation of toxins and particulates, but it did not identify the significance of these impacts (NRC 1996). In addition, the discharges of uranium and thorium from coal-fired plants can potentially produce radiological doses in excess of those arising from nuclear power plant operations (Gabbard 1993).

Regulatory agencies, including EPA and state agencies, set air emission standards and requirements based on human health impacts. These agencies also impose site-specific emission limits as needed to protect human health. As discussed previously, EPA has

recently noted that certain segments of the U.S. population (e.g., the developing fetus and subsistence fish-eating populations) are believed to be at potential risk of adverse health impacts due to mercury exposures from sources such as coal-fired power plants. However, in the absence of more quantitative data, human health impacts from radiological doses and inhaling toxins and particulates generated by burning coal are characterized as SMALL.

Siting the facility at this site other than Millstone would not change the impact on human health. Therefore, the impacts would be SMALL.

- **Socioeconomics**

Construction of the coal-fired alternative would take approximately five years. The staff assumed that construction would take place while Millstone continues operation and would be completed by the time Millstone permanently ceases operations. The workforce would be expected to vary between 1200 and 2500 workers during the five-year construction period (NRC 1996). These workers would be in addition to the approximately 1650 workers currently employed at Millstone. During construction, the surrounding communities would experience demands on housing and public services that could have noticeable impacts. These impacts would be tempered by construction workers commuting to the site from other counties. After construction, the communities would be impacted by the loss of the construction jobs, although this loss would be possibly offset by other growth occurring in the region.

If the coal-fired replacement plant were constructed at the Millstone site and Units 2 and 3 were decommissioned, there would be approximately 1250 fewer permanent high-paying jobs, with a commensurate reduction in demand on socioeconomic resources and contribution to the regional economy. However, as discussed previously, projected economic growth in southeastern Connecticut could temper or offset the projected loss of jobs from the closure of Millstone. The coal-fired plants would provide a new tax base to offset the loss of tax base associated with decommissioning of the nuclear units. For all these reasons, the appropriate characterization of nontransportation socioeconomic impacts for a coal-fired plant constructed at the Millstone site would be SMALL to MODERATE.

Construction of a replacement coal-fired power plant at an alternate site would relocate some socioeconomic impacts, but would not eliminate them. The communities around Millstone would still experience the impact of Millstone operational job loss (although potentially tempered by projected economic growth), and the communities around the new site would have to absorb the impacts of a large, temporary workforce (up to 2500 workers at the peak of construction) and a permanent workforce of approximately 400 workers. In the GEIS, the staff stated that socioeconomic impacts at an urban site would be smaller than at a rural site, because less of the peak construction workforce would need to move to

the area to work. The Millstone site is within commuting distance of the Hartford metropolitan area and is therefore not considered a rural site. Alternate sites would need to be analyzed on a case-by-case basis. Socioeconomic impacts at a rural site would be SMALL to LARGE.

- **Socioeconomics (Transportation)**

During the five-year construction period of replacement coal-fired units, up to 2500 construction workers would be working at the site in addition to the 1650 workers at Millstone. The addition of these workers could place significant traffic loads on existing highways. Such impacts could be noticeable but are not expected to be overwhelming.

For transportation related to commuting of plant operating personnel, the impacts are minor. The maximum number of plant operating personnel would be approximately 400. The current Millstone workforce is approximately 1650. Therefore, traffic impacts associated with plant personnel commuting to a coal-fired plant would be expected to be negligible compared to the current impacts from Millstone operations.

For rail transportation related to coal and lime delivery to the Millstone site, the impacts would be noticeable to significant. Each train would have approximately 100 open-top rail cars, each holding about 90 MT (100 tons) of coal or lime. Approximately 600 trains per year would be needed to deliver the coal and lime for the four coal-fired units. A total of 12 train trips is expected per week, or nearly 4 trips per day, because, for each full train delivery, there would be an empty train.

Transportation-related impacts associated with commuting construction workers at an alternate site are site-dependent, but could range from MODERATE to LARGE. Transportation impacts related to the commuting of plant operating personnel would also be site-dependent, but can be characterized as SMALL to MODERATE.

At an alternate site, coal and lime would likely be delivered by rail. Transportation impacts would depend upon the site location. Socioeconomic impacts associated with rail transportation would likely be MODERATE to LARGE.

- **Aesthetics**

If sited at Millstone, the four coal-fired power plant units could be as much as 60-m (200-ft) tall and be visible in daylight hours over many miles. The four exhaust stacks would be somewhere in the range of 120 to 185 meters (m) (400 to 600 feet [ft]) high. The units and associated stacks would also be visible at night because of outside lighting. Visual impacts of a new coal-fired plant could be mitigated by landscaping and by color selection for

buildings that is consistent with the environment. Visual impact at night could be mitigated by reduced use of lighting and appropriate use of shielding. Overall, the addition of a coal-fired unit and the associated stack at the Millstone site would likely have a MODERATE aesthetic impact.

Coal-fired generation would introduce mechanical sources of noise that would be audible offsite. Sources contributing to the total noise produced by plant operation are classified as continuous or intermittent. Continuous sources include the mechanical equipment associated with normal plant operations. Intermittent sources include the equipment related to coal handling, solid-waste disposal, transportation related to coal and lime delivery, use of outside loudspeakers, and the commuting of plant employees. Noise impacts associated with rail delivery of coal and lime to a plant at Millstone would be most significant for residents living in the vicinity of the facility and along the rail route. Although noise from passing trains significantly raises noise levels near the rail corridor, the short duration of the noise reduces the impact. Nevertheless, given the frequency of train transport and the many residents likely to be within hearing distance of the rail route, the impacts of noise on residents in the vicinity of the facility and the rail line would be noticeable. Overall, the aesthetic impacts at Millstone due to noise would be detectable. The incremental noise impacts of a coal-fired plant compared to existing Millstone operations would likely be SMALL to MODERATE.

At an alternate site, there would be a visual aesthetic impact from the buildings, exhaust stacks, and power-generation buildings. Noise and light from the plant would be detectable off site. Aesthetic impacts at the plant site would be mitigated because the site was the former location of a retired oil-fired plant. Noise impacts from a rail spur would be similar to the impacts at the existing site. Overall, the visual and noise aesthetic impacts associated with locating at an alternate site can be categorized as SMALL to MODERATE.

- **Historic and Archaeological Resources**

At the Millstone site or an alternate site, a cultural resource inventory would likely be needed for any onsite property that has not been previously surveyed. Other lands, if any, that are acquired to support the plant would also likely need an inventory of field cultural resources, identification and recording of existing historic and archaeological resources, and possible mitigation of adverse impacts from subsequent ground-disturbing actions related to physical expansion of the plant site.

Before construction at the Millstone site or an alternate site, studies would likely be needed to identify, evaluate, and address mitigation of the potential impacts of new plant construction on historic and archaeological resources. The studies would likely be needed for all areas of potential disturbance at the proposed plant site and along associated

corridors where new construction would occur (e.g., roads, transmission corridors, rail lines, or other rights-of-way). Historic and archaeological resource impacts need to be evaluated on a site-specific basis. The impacts can generally be effectively mitigated, and, as such, impacts would be expected to range from SMALL to MODERATE, depending on the historic and archaeological resources that may be present, and whether mitigation is necessary.

- **Environmental Justice**

  No environmental pathways or locations have been identified that would result in disproportionately high and adverse environmental impacts on minority and low-income populations if a replacement coal-fired plant were built at the Millstone site. Some impacts on housing availability and prices during construction might occur, and this could disproportionately affect minority and low-income populations. Closure of Millstone would result in employment of approximately 1250 fewer operating employees, possibly offset by growth in the southeastern Connecticut area. Following construction of the replacement coal-fired plant, it is possible that the ability of local government to maintain social services could be reduced at the same time as diminished economic conditions reduce employment prospects for minority or low-income populations. Overall, impacts would be SMALL to MODERATE, and would depend on both the extent to which projected economic growth is realized and also on the ability of minority or low-income populations to commute to other jobs outside the southeastern Connecticut area.

  Impacts at other sites would depend upon the site chosen and the nearby population distribution, but would likely also be SMALL to MODERATE.

8.2.1.2 Once-Through Cooling System

This section discusses the environmental impacts of constructing a coal-fired generation system at the Millstone site using once-through cooling. The impacts (SMALL, MODERATE, or LARGE) of this option are the same as the impacts for a coal-fired plant using the closed-cycle system. However, there are minor environmental differences between the closed-cycle and once-through cooling systems. Table 8-3 summarizes the incremental differences.

8.2.2 Natural Gas-Fired Generation

The environmental impacts of the natural gas-fired alternative are examined in this section for both the Millstone site and an alternate site (retired oil-fired plant site). The staff assumed that the plant would use a closed-cycle cooling system. In Section 8.2.2.1, the staff also evaluated the impacts of using the existing open-cycle cooling system at the Millstone site.

Table 8-3. Summary of Environmental Impacts of Coal-Fired Generation at the Millstone Site with Once-Through Cooling

Impact Category	Change in Impacts from Once-Through Cooling System
Land Use	Impacts would be less (e.g., through elimination of cooling towers).
Ecology	Impacts would be greater on aquatic ecology at the site; potential impacts associated with entrainment of fish and shellfish in early life stages, impingement of fish and shellfish, and heat shock.
Water Use and Quality—Surface Water	Increased water withdrawal; thermal load higher than with closed-cycle cooling.
Water Use and Quality—Groundwater	No change
Air Quality	No change
Waste	No change
Human Health	No change
Socioeconomics	No change
Socioeconomics (Transportation)	No change
Aesthetics	Elimination of cooling towers
Historic and Archaeological Resources	No change
Environmental Justice	No change

The Millstone site and an alternate site would need a 41-centimeter (cm) (16-inch [in]) diameter natural gas pipeline constructed from the plant site to a supply point where a reliable supply of natural gas would be available.

The staff assumed that a replacement natural gas-fired plant would use combined-cycle technology (Dominion 2004). In a combined-cycle unit, hot combustion gases in a combustion turbine rotate the turbine to generate electricity. Waste combustion heat from the combustion turbine is routed through a heat-recovery boiler to make steam to generate additional electricity. The staff assumed that a replacement natural gas-fired plant would use combined-cycle combustion turbines as described by Dominion (Dominion 2004). Dominion estimates that the plant would consume approximately 2.4 million m^3 (85.7 billion ft^3) of natural gas annually (Dominion 2004).

Unless otherwise indicated, the assumptions and numerical values used in Section 8.2.2 are from the Dominion ER (Dominion 2004). The staff reviewed this information and compared it to

environmental impact information in the GEIS. Although the OL renewal period is only 20 years, the impact of operating the natural gas-fired alternative for 40 years is considered (as a reasonable projection of the operating life of a natural gas-fired plant).

8.2.2.1 Closed-Cycle Cooling System

The overall impacts of the natural gas-generating system are discussed in the following sections and summarized in Table 8-4. The extent of impacts at an alternate site (retired oil-fired plant) will depend on the location of the particular site selected.

Table 8-4. Summary of Environmental Impacts of Natural Gas-Fired Generation at Millstone and an Alternate Site Using Closed-Cycle Cooling

	Millstone Site		Alternate Site	
Impact Category	**Impact**	**Comments**	**Impact**	**Comments**
Land Use	SMALL to MODERATE	45 ha (110 ac) for power-block, offices, roads, and parking areas. Additional impact for construction of an underground gas pipeline.	SMALL to MODERATE	45 ha (110 ac) for power-block, offices, roads, and parking areas. Additional impact for construction and/or upgrade of an underground gas pipeline.
Ecology	SMALL to MODERATE	Would use undeveloped areas at current Millstone site, plus gas pipeline. Smaller impacts to aquatic resources because less cooling water required.	SMALL to MODERATE	Impact depends on location and ecology of the site, surface-water body used for intake and discharge, and pipeline routes; potential habitat loss and fragmentation, reduced productivity and biological diversity. Likely plant sites already have power-generation facilities.
Water Use and Quality—Surface Water	SMALL	Would use existing intake and discharge structures. Less water use because closed-cycle replaces once-through cooling system.	SMALL to MODERATE	Impact depends on volume of water withdrawal and discharge and characteristics of surface water body.
Water Use and Quality—Groundwater	SMALL	Millstone site would use little groundwater.	SMALL to MODERATE	Impact would depend on volume of water withdrawal.

Table 8-4. (contd)

	Millstone Site		Alternate Site	
Impact Category	Impact	Comments	Impact	Comments
Air Quality	MODERATE	Sulfur oxides • 136 MT/yr (150 tons/yr) Nitrogen oxides • 511 MT/yr (564 tons/yr) Carbon monoxide • 671 MT/yr (740 tons/yr) PM_{10} particulates • 200 MT/yr (220 tons/yr) Some hazardous air pollutants	MODERATE	Same emissions as Millstone site.
Waste	SMALL	Small amount of ash produced.	SMALL	Same waste produced as if produced at the Millstone site.
Human Health	SMALL	Impacts considered to be minor.	SMALL	Impacts considered to be minor.
Socioeconomics	SMALL to MODERATE	During construction, impacts would be noticeable. Up to 1200 additional workers during the peak of the three-year construction period, followed by reduction from current Millstone workforce of 1650 to 55; tax base preserved. Impacts during operation would be minor.	SMALL to MODERATE	During construction, impacts would be noticeable. Up to 1200 additional workers during the peak of the three-year construction period. City of Waterford would experience loss of tax base and employment, potentially offset by possible economic growth.
Socioeconomics (Transportation)	SMALL to MODERATE	Transportation impacts likely would be noticeable during construction and slight for operations.	SMALL to MODERATE	Transportation impacts likely would be noticeable during construction and slight for operations.

Table 8-4. (contd)

	Millstone Site		Alternate Site	
Impact Category	Impact	Comments	Impact	Comments
Aesthetics	SMALL to MODERATE	Visual aesthetic impact due to plant units and stacks could be mitigated by landscaping and appropriate color selection for buildings. Visual impact at night could be mitigated by reduced use of lighting and appropriate shielding. Noise impacts would be relatively small and could be mitigated.	SMALL to MODERATE	Impact would depend on location of site. Similar to Millstone if located on retired oil-fired plant site.
Historic and Archeological Resources	SMALL to MODERATE	Any potential impacts can likely be effectively mitigated.	SMALL to MODERATE	Same as Millstone; any potential impacts can likely be effectively mitigated.
Environmental Justice	SMALL to MODERATE	Impacts on minority and low-income communities should be similar to those experienced by the population as a whole. Some impacts on housing may occur during construction; loss of 1595 operating jobs at Millstone. Plant could reduce employment prospects for minority and low-income populations. Impacts could be offset by possible economic growth and the ability of affected workers to commute.	SMALL to MODERATE	Impacts vary, depending on population distribution and make-up at site.

- **Land Use**

For siting at Millstone, existing facilities and infrastructure would be used to the extent practicable, limiting the amount of new construction that would be required. Specifically, the staff assumed that the natural gas-fired replacement plant alternative would need to modify and use the existing cooling system, switchyard, offices, and transmission line right(s)-of-way. Much of the land that would be used has been previously disturbed. At Millstone, the staff assumed that approximately 45 ha (110 ac) would be needed for the plant and associated infrastructure. There would be an additional impact for construction of a gas pipeline.

For construction at an alternate site, the staff assumed that 20 ha (50 ac) would be needed for the plant and associated infrastructure for a 1000-MW(e) plant (NRC 1996). Therefore, the staff assumed about 45 ha (110 ac) would be needed to replace the over 2000 MW(e) Millstone power generation. In addition, construction and/or upgrade of an underground pipeline would result in additional land disturbance at an alternate site.

Regardless of where the gas-fired plant is built, additional land would be required for natural gas wells and collection stations. Partially offsetting these offsite land requirements would be the elimination of the need for uranium mining to supply fuel for Millstone. In the GEIS (NRC 1996), the staff estimated that approximately 400 ha (1000 ac) would be affected for mining the uranium and processing it during the operating life of a nuclear power plant. Overall, land-use impacts would be expected to be SMALL to MODERATE.

- **Ecology**

At the Millstone site, there would be minor ecological impacts due to changes land use resulting from siting of the gas-fired plant. There would also be ecological impacts associated with bringing a new underground gas pipeline to the Millstone site. Additionally, there may be some impact on terrestrial ecology from saltwater drift from the cooling towers. Impacts to aquatic resources would likely be less than the current Millstone operations even if the existing intake and discharge structures are used because less cooling water would be required. Ecological impacts at an alternate site would depend on the nature of the land converted for the plant and the possible need for a new gas pipeline. Construction of the transmission line and construction and/or upgrading of the gas pipeline to serve the plant would be expected to have temporary ecological impacts. Ecological impacts to the plant site and utility easements could include impacts on threatened or endangered species, wildlife habitat loss and reduced productivity, habitat fragmentation, and a local reduction in biological diversity. Depending on the location of an alternate site, the cooling make-up water intake and discharge could impact aquatic resources. Overall, the ecological impacts would be expected to be SMALL to MODERATE at either location.

- **Water Use and Quality—Surface Water**

Each of the gas-fired units would include a heat-recovery boiler from which steam would turn an electric generator. Steam would be condensed and circulated back to the boiler for reuse. A natural gas-fired plant sited at Millstone is assumed to use a closed-cycle cooling system. Existing intake and discharges would be used; however, cooling towers and other cooling system components would be constructed, replacing the existing once-through cooling system. Surface-water impacts at the Millstone site would be expected to be SMALL; the impacts would be sufficiently minor that they would not noticeably alter any important attribute of the resource.

A natural gas-fired plant at an alternate site is assumed to use a closed-cycle cooling system with cooling towers. The staff assumed that surface water would be used for cooling make-up water and discharge. Intake and discharge would involve relatively small quantities of water compared to the coal alternative. The impact on the surface water would depend on the volume of water needed for make-up water, the discharge volume, and the characteristics of the receiving body of water. Intake from and discharge to any surface body of water would be regulated by the state of Connecticut. The impacts would be SMALL to MODERATE.

The issue of water-quality impact from sedimentation during construction was characterized in the GEIS as SMALL. The staff also noted in the GEIS that operational water quality impacts would be similar to, or less than, those from other generating technologies. Sedimentation impacts from construction of a natural gas-fired plant at the Millstone site or at an alternate site would be short-term and easily mitigated.

- **Water Use and Quality—Groundwater**

The staff assumed that the ground-water wells would continue to be used for non-Millstone related activities (e.g., watering of baseball fields) located on the Millstone site. Ground-water withdrawals for a natural gas-fired plant at the Millstone site would be equal to or less than the withdrawals for the no-action and license renewal alternatives. Hence, impacts would be SMALL. Use of groundwater for a gas-fired plant located at an alternate site is a possibility. Ground-water withdrawals at an alternate site would likely require a permit from the state of Connecticut. The impacts will depend on the characteristics of the site and the amount of groundwater used. Therefore, the impacts would be SMALL to MODERATE.

- **Air Quality**

Natural gas is a relatively clean-burning fuel. The gas-fired alternative would release similar types of emissions, but in lesser quantities than the coal-fired alternative.

A new gas-fired generating plant located in Connecticut would likely need a prevention of significant deterioration permit and an operating permit under the Clean Air Act. A new combined-cycle natural gas power plant would also be subject to the new source performance standards for such units at 40 CFR Part 60, Subparts Da and GG. These regulations establish emission limits for particulates, opacity, SO_2, and NO_x.

Section 169A of the Clean Air Act (42 USC 7491) establishes a national goal of preventing future and remedying existing impairment of visibility in mandatory Class I Federal areas when impairment results from human made air pollution. EPA issued a new regional haze

rule on July 1, 1999 (64 *Federal Register* [FR] 35714 [EPA 1999]). The rule specifies that for each mandatory Class I Federal area located within a state, the state must establish goals that provide for reasonable progress toward achieving natural visibility conditions. The reasonable progress goals must provide for an improvement in visibility for the most-impaired days over the period of the implementation plan and ensure no degradation in visibility for the least-impaired days over the same period [40 CFR 51.308(d)(1)]. If a coal-fired plant were located close to a mandatory Class I Federal area, additional air pollution control requirements could be imposed. There are no Class I areas in Connecticut.

In 1998, EPA issued a rule requiring 22 eastern states, including Connecticut, to revise their state implementation plans to reduce nitrogen oxide emissions. Nitrogen oxide emissions contribute to violations of the national ambient air quality standard for ozone. The total amount of nitrogen oxides that can be emitted by each of the 22 states in the year 2007 ozone season (May 1 to September 30) is set out at 40 CFR 51.121(e). For Connecticut, the amount is 38,873 MT (42,850 tons).

EPA has various regulatory requirements for visibility protection in 40 CFR Part 51, Subpart P, including a specific requirement for review of any new major stationary source in an area designated attainment or unclassified under the Clean Air Act. The entire state of Connecticut has been designated as an attainment area for carbon monoxide, nitrogen dioxide, lead, and sulfur dioxide. New London County is also designated as in attainment for particulate matter with a diameter of 10 μm or less. New London County has been designated as serious nonattainment for the EPA one-hour ozone standard (40 CFR 81.307; CTDEP 2002a).

Dominion projects the following emissions for the natural gas-fired alternative (Dominion 2004):

Sulfur oxides — 136 MT/yr (150 tons/yr)
Nitrogen oxides — 511 MT/yr (564 tons/yr)
Carbon monoxide — 671 MT/yr (740 tons/yr)
PM_{10} particulates — 200 MT/yr (220 tons/yr)

A natural gas-fired plant would also have unregulated carbon dioxide emissions that could contribute to global warming.

In December 2000, EPA issued regulatory findings on emissions of hazardous air pollutants from electric utility steam-generating units (EPA 2000a). Natural gas-fired power plants were found by EPA to emit arsenic, formaldehyde, and nickel (EPA 2000a). Unlike coal and

oil-fired plants, EPA did not determine that emissions of hazardous air pollutants from natural gas-fired power plants should be regulated under Section 112 of the Clean Air Act.

Construction activities would result in temporary fugitive dust. Exhaust emissions would also come from vehicles and motorized equipment used during the construction process.

The emissions discussed above would likely be the same at Millstone or at an alternate site. Impacts from the above emissions would be clearly noticeable, but would not be sufficient to destabilize air resources as a whole.

The overall air-quality impact for a new natural gas-fired plant sited at Millstone or at an alternate site would be expected to be MODERATE.

- **Waste**

There will be spent selective catalytic reduction catalyst from NO_x emissions control and small amounts of solid-waste products (i.e., ash) from burning natural gas fuel. In the GEIS, the staff concluded that waste generation from gas-fired technology would be minimal (NRC 1996). Gas firing results in very few combustion by-products because of the clean nature of the fuel. Waste-generation impacts would be so minor that they would not noticeably alter any important resource attribute. Construction-related debris would be generated during construction activities. Overall, the waste impacts would be SMALL for a natural gas-fired plant sited at Millstone or at an alternate site.

- **Human Health**

In Table 8-2 of the GEIS, the staff identifies cancer and emphysema as potential health risks from gas-fired plants (NRC 1996). The risk may be attributable to NO_x emissions that contribute to ozone formation, which, in turn, contributes to health risks. NO_x emissions from any gas-fired plant would be regulated. For a plant sited in Connecticut, NO_x emissions would be regulated by the CTDEP. Human health impacts would not be detectable or would be sufficiently minor. Overall, the impacts on human health of the natural gas-fired alternative sited at Millstone or at an alternate site would be SMALL.

- **Socioeconomics**

Construction of a natural gas-fired plant would take approximately three years. Peak employment would be approximately 1200 workers (NRC 1996). The staff assumed that construction would take place while Millstone continues operation and would be completed by the time it permanently ceases operations. During construction, the communities surrounding the Millstone site would experience demands on housing and public services

that could have noticeable impact. These impacts would be tempered by construction workers commuting to the site from other parts of New London County or from other counties. After construction, the communities would be impacted by the loss of jobs. The current Millstone workforce (1650 workers) would decline through a decommissioning period to a minimal maintenance size. The gas-fired plant would introduce a replacement tax base at Millstone or an alternate site and approximately 55 new permanent jobs. For siting at an alternate site, impacts in New London County resulting from decommissioning of Millstone may be offset by economic growth projected to occur in the region.

In the GEIS (NRC 1996), the staff concluded that socioeconomic impacts from constructing a natural gas-fired plant would not be noticeable and that the small operational workforce would have the lowest socioeconomic impacts of any nonrenewable technology. Compared to the coal-fired and nuclear alternatives, the smaller size of the construction workforce, the shorter construction time frame, and the smaller size of the operations workforce would mitigate socioeconomic impacts. For these reasons, socioeconomic impacts associated with construction and operation of a natural gas-fired power plant at Millstone or at an alternate site would be SMALL to MODERATE. Depending on other growth in the area, socioeconomic impacts could be noticeable, but they would not destabilize any important socioeconomic attribute.

- **Socioeconomics (Transportation)**

Transportation impacts associated with construction and operating personnel commuting to the plant site would depend on the population density and transportation infrastructure in the vicinity of the site. The impacts would be SMALL to MODERATE for siting at Millstone or at an alternate site.

- **Aesthetics**

The turbine buildings, exhaust stacks [approximately 61 m (200 ft) tall], cooling towers, and the plume from the cooling towers would be visible from off site during daylight hours. Visual impacts could be mitigated by landscaping and selecting a color for buildings that is consistent with the environment. Visual impact at night could be mitigated by reduced use of lighting and appropriate use of shielding. The gas pipeline compressors also would be visible. Noise and light from the plant would be detectable offsite. Overall, the aesthetic impacts associated with constructing and operating a natural gas-fired plant at the Millstone site would be SMALL to MODERATE.

At an alternate site, the buildings, cooling towers, cooling tower plumes, and the associated gas pipeline compressors would be visible offsite. Aesthetic impacts would be mitigated by

location of the plant at a retired oil-fired plant site. Overall, the aesthetic impacts associated with constructing and operating a natural gas-fired plant at the Millstone site would be SMALL to MODERATE.

- **Historic and Archaeological Resources**

  At both Millstone and an alternate site, a cultural resource inventory would likely be needed for any onsite property that has not been previously surveyed. Other land, if any, acquired to support the plant would also likely need an inventory of field cultural resources, identification and recording of existing historic and archaeological resources, and possible mitigation of adverse impacts from subsequent ground-disturbing actions related to physical expansion of the plant site.

  Before construction at Millstone or an alternate site, studies would likely be needed to identify, evaluate, and address mitigation of the potential impacts of new plant construction on historic and archaeological resources. The studies would likely be needed for all areas of potential disturbance at the proposed plant site and along associated corridors where new construction would occur (e.g., roads, transmission and pipeline corridors, or other rights-of-way). Impacts to historic and archaeological resources can be managed and mitigated to a certain extent under current laws and regulations. Therefore, impacts to historic and archaeological resources from a natural gas-fired plant would be expected to be SMALL to MODERATE, depending on the resources that may be present and whether mitigation is necessary.

- **Environmental Justice**

  No environmental pathways or locations have been identified that would result in disproportionately high and adverse environmental impacts on minority and low-income populations if a replacement natural gas-fired plant were built at the Millstone site. Some impacts on housing availability and prices during construction might occur, and this could disproportionately affect minority and low-income populations. Closure of Millstone would result in a decrease in employment of approximately 1595 operating employees, possibly offset by general growth in the southeastern Connecticut area. Following construction, the local government's ability to maintain social services could be reduced at the same time as diminished economic conditions reduce employment prospects for minority or low-income populations. Overall, impacts are expected to be SMALL to MODERATE, especially since minority and low-income populations are not in the immediate vicinity of the Millstone site. Projected economic growth in southeastern Connecticut and the ability of minority and low-income populations to commute to other jobs outside the Waterford area could mitigate any adverse impacts.

Impacts at an alternate site would depend upon the site chosen and the nearby population distribution, but would also be expected to be SMALL to MODERATE.

8.2.2.2 Once-Through Cooling System

This section discusses the environmental impacts of constructing a natural gas-fired generation system at the Millstone site using once-through cooling. The impacts (SMALL, MODERATE, or LARGE) of this option are the same as the impacts for a natural gas-fired plant using the closed-cycle system. However, there are minor environmental differences between the closed-cycle and once-through cooling systems. Table 8.5 summarizes the incremental differences.

8.2.3 Nuclear Power Generation

Since 1997, the NRC has certified three new standard designs for nuclear power plants under 10 CFR Part 52, Subpart B. These designs are the 1300 MW(e) U.S. Advanced Boiling Water Reactor (10 CFR Part 52, Appendix A), the 1300 MW(e) System 80+ Design (10 CFR Part 52, Appendix B), and the 600 MW(e) AP600 Design (10 CFR Part 52, Appendix C). All of these plants are light-water reactors. On September 13, 2004, the Commission issued the Final Design Approval for the AP1000 Design; the staff anticipates that the certification for this design will be finalized in December 2005. Although no applications for a construction permit or a combined license based on these certified designs have been submitted to NRC, the submission of the design certification applications indicates continuing interest in the possibility of licensing new nuclear power plants. In addition, recent escalation in prices of natural gas and electricity have made new nuclear power plant construction more attractive from a cost standpoint. Additionally, System Energy Resources, Inc., Exelon Generating Company, LLC, and Dominion Nuclear North Anna, LLC, have recently submitted applications for early site permits under the procedures in 10 CFR Part 52, Subpart A.

Consequently, construction of a new nuclear power plant at both the Millstone site and an alternate is considered in this section. The staff assumed that the new nuclear plant would have a 40-year lifetime. Consideration of a new nuclear generating plant to replace Millstone was not included in the Dominion ER.

NRC has summarized environmental data associated with the uranium fuel cycle in Table S-3 of 10 CFR 51.51. The impacts shown in Table S-3 are representative of the impacts that would be associated with a replacement nuclear power plant built to one of the certified designs and sited at Millstone or an alternate site. The impacts shown in Table S-3 are for a 1000-MW(e) reactor and would need to be adjusted to reflect impacts of 2024-MW(e) of new nuclear power.

Table 8-5. Summary of Environmental Impacts of Natural Gas-Fired Generation at the Millstone Site with Once-Through Cooling

Impact Category	Change in Impacts from Once-Through Cooling System
Land Use	Impacts would be less (e.g., through elimination of cooling towers).
Ecology	Impact would be greater on aquatic ecology at the site. Potential impacts associated with entrainment of fish and shellfish in early life stages, impingement of fish and shellfish, and heat shock.
Water Use and Quality—Surface Water	Increased water withdrawal; thermal load higher than with closed-cycle cooling.
Water Use and Quality—Groundwater	No change
Air Quality	No change
Waste	No change
Human Health	No change
Socioeconomics	No change
Transportation	No change
Aesthetics	Elimination of cooling towers
Historic and Archaeological Resources	No change
Environmental Justice	No change

The environmental impacts associated with transporting fuel and waste to and from a light-water cooled nuclear power reactor are summarized in Table S-4 of 10 CFR 51.52. The summary of NRC's findings on National Environmental Policy Act issues for license renewal of nuclear power plants in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, is also relevant, although not directly applicable, for consideration of environmental impacts associated with the operation of a replacement nuclear power plant. Additional environmental impact information for a replacement nuclear power plant using closed-cycle cooling is presented in Section 8.2.3.1, and using open-cycle cooling in Section 8.2.3.2.

8.2.3.1 Closed-Cycle Cooling System

The overall impacts of the nuclear generating system are discussed in the following sections. The impacts are summarized in Table 8-6. The magnitude of impacts at an alternate site would depend on the location of the particular site selected.

Table 8-6. Summary of Environmental Impacts of New Nuclear Power Generation at the Millstone Site and an Alternate Site Using Closed-Cycle Cooling

	Millstone Site		Alternate Site	
Impact Category	**Impact**	**Comments**	**Impact**	**Comments**
Land Use	MODERATE	Would require approximately 200 to 400 ha (500 to 1000 ac) for the plant. Additional area would need to be purchased.	MODERATE to LARGE	Same as Millstone site, except may need to construct rail spur for construction.
Ecology	SMALL to MODERATE	Would use undeveloped and previously disturbed areas at current Millstone site and adjacent property. Use of closed-cycle system would have negligible impact on aquatic resources.	SMALL to MODERATE	Impact would depend on location and ecology of the site, surface-water body used for intake and discharge, and potential rail spur route; potential habitat loss and fragmentation; reduced productivity and biological diversity.
Water Use and Quality—Surface Water	SMALL	Would use existing intake and discharge structures with new closed-cycle system. Less water use compared to existing system.	SMALL to MODERATE	Impact would depend on the volume of water withdrawn and discharged and the characteristics of the surface-water body.
Water Use and Quality—Groundwater	SMALL	Millstone uses little groundwater.	SMALL to MODERATE	Impact would depend on the volume of water withdrawn and discharged and the characteristics of the surface-water body.
Air Quality	SMALL	Fugitive emissions and emissions from vehicles and equipment during construction; small amount of emissions from diesel generators and possibly other sources during operation.	SMALL	Same impacts as Millstone site

Table 8-6. (contd)

Impact Category	Millstone Site Impact	Millstone Site Comments	Alternate Site Impact	Alternate Site Comments
Waste	SMALL	Waste impacts for an operating nuclear power plant are set out in 10 CFR Part 51, Appendix B, Table B-1. Debris would be generated and removed during construction.	SMALL	Same impacts as Millstone site
Human Health	SMALL	Human health impacts for an operating nuclear power plant are set out in 10 CFR Part 51, Appendix B, Table B-1.	SMALL	Same impacts as Millstone site
Socioeconomics	SMALL to MODERATE	During construction, impacts would be noticeable. Up to 2500 workers during peak period of the six-year construction period. Operating workforce assumed to be similar to Millstone; tax base preserved. Impacts during operation would be negligible.	SMALL to LARGE	Construction impacts depend on location. City of Waterford would experience loss of tax base and employment, possibly offset by economic growth.
Socioeconomics (Transportation)	SMALL to LARGE	Transportation impacts associated with construction workers could be noticeable to significant. Transportation impacts of commuting plant personnel would be slight.	SMALL to LARGE	Transportation impacts of construction workers could be noticeable to significant. Transportation impacts of commuting plant personnel could be slight to noticeable.
Aesthetics	MODERATE	Visual aesthetic impact due to impact of plant units and stacks on local area. Daytime visual impact could be mitigated by landscaping and appropriate color selection for buildings. Visual impact at night could be mitigated by reduced use of lighting and appropriate shielding. Noise impacts would be relatively small and could be mitigated.	SMALL to MODERATE	Dependent on location of site; however, likely similar to Millstone site.
Historic and Archaeological Resources	SMALL to MODERATE	Any potential impacts can likely be effectively managed.	SMALL to MODERATE	Any potential impacts can likely be effectively managed.

Table 8-6. (contd)

	Millstone Site		Alternate Site	
Impact Category	Impact	Comments	Impact	Comments
Environmental Justice	SMALL	Impacts on minority and low-income communities should be similar to those experienced by the population as a whole. Some impacts on housing may occur during construction.	SMALL to MODERATE	Impacts will vary, depending on population distribution and make-up at the site. Impacts to minority and low-income residents of New London County associated with closure of Millstone could be significant, but could also be mitigated by projected economic growth for the area.

- **Land Use**

The existing facilities and infrastructure at the Millstone site would be used to the extent practicable, limiting the amount of new construction that would be required. Specifically, the staff assumed that a replacement nuclear power plant would need to construct a new closed-cycle system including cooling towers; however, the existing intake and discharge structures would be used. In addition, the staff assumed other existing structures would be used, including the switchyard, offices, and transmission line ROWs. Much of the land that would be used has been previously disturbed.

A replacement nuclear power plant at the Millstone site would alter approximately 200 to 400 ha (500 to 1000 ac) of land to industrial use. Additional land may need to be purchased because the Millstone site is only 212 ha (525 ac). There would be no net change in land needed for uranium mining because land needed for the new nuclear plant would offset land needed to supply uranium for fuel for Millstone.

The impact of a replacement nuclear generating plant on land use at the existing Millstone site is best characterized as MODERATE. The impact would be greater than the OL renewal alternative.

Land-use impacts at an alternate site (site of a retired oil-fired generation plant) would be similar to siting at Millstone. A closed-cycle cooling system including cooling towers may be needed. In addition, it may be necessary to construct a rail spur to an alternate site to bring in equipment during construction. The staff assumed that existing transmission line, switchyard, and other existing facilities would be used. Siting a new nuclear plant at an alternate site would result in MODERATE to LARGE land-use impacts.

- **Ecology**

Locating a replacement nuclear power plant at the Millstone site would alter ecological resources because of the need to convert roughly 200 to 400 ha (500 to 1000 ac) of land to industrial use. Additional land would be needed because the Millstone site is only 212 ha (525 acres) in size. Some of this land, however, would have been previously disturbed. Use of a closed-cycle cooling system would result in minor impact on aquatic resources. Siting at Millstone would have a SMALL to MODERATE ecological impact and would be greater than renewal of the Millstones OLs.

At an alternate site, there would be construction impacts and new incremental operational impacts. Even assuming siting at a previously disturbed area, the impacts would alter the ecology. Impacts could include wildlife habitat loss, reduced productivity, habitat fragmentation, and a local reduction in biological diversity. Use of cooling make-up water from a nearby surface water body could have adverse aquatic resource impacts. Construction of a rail spur, if needed, would have ecological impacts. Overall, the ecological impacts at an alternate site would be SMALL to MODERATE.

- **Water Use and Quality—Surface Water**

The replacement nuclear plant alternative at the Millstone site is assumed to use a new closed-cycle cooling system (including cooling towers) and the existing intake and discharge structures. This would minimize incremental water use and quality impacts. Surface-water impacts would be SMALL; the impacts would be sufficiently minor that they would not noticeably alter any important attribute of the resource.

Cooling towers would also likely be used at an alternate site. For an alternate site, the impact on the surface water would depend on the volume of water needed for make-up water, the discharge volume, and the characteristics of the receiving body of water. Intake from and discharge to any surface body of water would be regulated by the state of Connecticut. The impacts would be SMALL to MODERATE.

Water quality impact from sedimentation during construction was characterized in the GEIS as SMALL. The staff also noted in the GEIS that operational water-quality impacts would be similar to or less than those from other generating technologies. Sedimentation impacts from construction of a new nuclear power plant at the Millstone site or at an alternate site would be short-term and easily mitigated.

- **Water Use and Quality—Groundwater**

No groundwater is currently used for the operation of Millstone (only for irrigation of ball fields by the town of Waterford). It is unlikely that groundwater would be used for an alternative nuclear power plant sited at Millstone. Use of groundwater for a nuclear power plant sited at an alternate site is a possibility. Any ground-water withdrawal would require a permit from the local permitting authority. Therefore, impact to groundwater would be SMALL at the Millstone site and SMALL to MODERATE at an alternate site.

- **Air Quality**

Construction of a new nuclear plant sited at Millstone or an alternate site would result in fugitive emissions during the construction process. Exhaust emissions would also come from vehicles and motorized equipment used during the construction process. An operating nuclear plant would have minor air emissions associated with diesel generators and other minor intermittent sources. These emissions are regulated. Emissions for a plant sited at Millstone or elsewhere in Connecticut would be regulated by the CTDEP. Overall, emissions and associated impacts would be SMALL.

- **Waste**

The waste impacts associated with operation of a nuclear power plant are set out in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B. Construction-related debris would be generated during construction activities and removed to an appropriate disposal site. Overall, waste impacts for a replacement nuclear unit at Millstone would be SMALL.

Siting the replacement nuclear power plant at a site other than the Millstone site would not alter waste generation. Therefore, the impacts would be SMALL.

- **Human Health**

Human health impacts for an operating nuclear power plant are set out in 10 CFR Part 51 Subpart A, Appendix B, Table B-1. Overall, human health impacts from siting the replacement nuclear power plant at Millstone or another site would result in negligible human health impacts. Therefore, the impacts would be SMALL.

- **Socioeconomics**

The construction period and the peak workforce associated with construction of a new nuclear power plant are currently unquantified (NRC 1996). In the absence of quantitative

data, staff assumed a construction period of six years and a peak workforce of 2500. The staff assumed that construction would take place while the existing nuclear units continue operation and would be completed by the time Millstone permanently ceases operations. During construction, the communities surrounding the Millstone site would experience demands on housing and public services that could have noticeable impacts. These impacts would be tempered by construction workers commuting to the site from other parts of southeastern Connecticut. After construction, the communities would be impacted by the loss of the construction jobs, although this loss would be possibly offset by other growth in the area.

The replacement nuclear units are assumed to have an operating workforce comparable to the 1650 workers currently working at Millstone. The replacement nuclear units would provide a new tax base to offset the loss of tax base associated with decommissioning of Millstone. For all of these reasons, the appropriate characterization of nontransportation socioeconomic impacts for replacement nuclear units constructed at Millstone would be SMALL to MODERATE; the socioeconomic impacts would be noticeable, but would be unlikely to destabilize the area's economy.

Construction of a replacement nuclear power plant at an alternate site would relocate some socioeconomic impacts, but would not eliminate them. The communities around the Millstone site would still experience the impact of Millstone operational job loss (although potentially tempered by projected economic growth). The communities around the new site would have to absorb the impacts of a large, temporary workforce (up to 2500 workers at the peak of construction) and a permanent workforce of approximately 1650 workers. In the GEIS (NRC 1996), the staff indicated that socioeconomic impacts at a rural site would be larger than at an urban site because more of the peak construction workforce would need to move to the area to work. The Millstone site is within commuting distance of at least three metropolitan areas and is therefore not considered a rural site. Alternate sites would need to be analyzed on a case-by-case basis. Socioeconomic impacts at a rural site would be SMALL to LARGE.

- **Socioeconomics (Transportation)**

During the six-year construction period, up to 2500 construction workers would be working at the Millstone site in addition to the 1650 workers at Millstone. The addition of the construction workers could place significant traffic loads on existing highways, particularly those leading to the Millstone site. Such impacts would be noticeable to significant. Transportation impacts related to commuting of plant operating personnel would be similar to current impacts associated with operation of Millstone and would be negligible. Transportation-related impacts associated with commuting construction workers at an alternate site are site-dependent, but could be noticeable to significant. Transportation

impacts related to commuting of plant operating personnel would also be site-dependent, but can be characterized as slight to noticeable. Overall transportation impacts would range from SMALL to LARGE at the Millstone site or at an alternate site.

- **Aesthetics**

The containment buildings for a replacement nuclear power plant sited at Millstone and other associated buildings would likely be visible in daylight hours over many miles. The replacement nuclear units would also likely be visible at night because of outside lighting. Visual impacts could be mitigated by landscaping and selecting a color for buildings that is consistent with the environment. Visual impact at night could be mitigated by reduced use of lighting and appropriate use of shielding. No exhaust stacks would be needed. Cooling towers constructed for the closed-cycle system would be visible. Noise impacts from a new nuclear plant at the Millstone site would be similar to those from the existing Millstone Units 2 and 3. Mitigation measures, such as reduced or no use of outside loudspeakers, can be employed to reduce noise levels. Overall, the aesthetic impact associated with siting a replacement nuclear unit at Millstone would be MODERATE.

At an alternate site, there would be aesthetic impacts from the buildings, cooling towers, and the plume associated with the cooling towers. Noise and light from the plant would be detectable offsite. The impact of noise and light could be mitigated if the plant is located in an industrial area adjacent to other power plants. Overall the aesthetic impacts associated with locating at an alternative site would depend on the location of the site and would be SMALL to MODERATE.

- **Historic and Archaeological Resources**

At both Millstone and an alternate site, a cultural resource inventory would likely be needed for any onsite property that has not been previously surveyed. Other land, if any, acquired to support the plant would also likely need an inventory of field cultural resources, identification and recording of existing historic and archaeological resources, and possible mitigation of adverse impacts from subsequent ground-disturbing actions related to physical expansion of the plant site.

Before construction at Millstone or another site, studies would likely be needed to identify, evaluate, and address mitigation of the potential impacts of new plant construction on historic and archaeological resources. The studies would likely be needed for all areas of potential disturbance at the proposed plant site and along associated corridors where new construction would occur (e.g., roads, transmission corridors, rail lines, or other ROWs).

Historic and archaeological resource impacts can generally be effectively mitigated and, therefore, would be expected to be SMALL to MODERATE whether at Millstone or at an alternate site.

- **Environmental Justice**

  No environmental pathways or locations have been identified that would result in disproportionately high and adverse environmental impacts on minority and low-income populations if a replacement nuclear plant were built at the Millstone site. Some impacts on housing availability and prices during construction might occur, and this could disproportionately affect the minority and low-income populations. After completion of construction, it is possible that the ability of the local government to maintain social services could be reduced at the same time as diminished economic conditions reduce employment prospects for the minority and low-income populations. Overall, impacts would be SMALL. Economic growth in southeastern Connecticut and the ability of minority and low-income populations to commute to other jobs area could mitigate any adverse impacts.

  Impacts at other sites would depend upon the site chosen and the nearby population distribution, but would be SMALL to MODERATE. Impacts associated with closure of Millstone that could affect minority and low-income residents of southeastern Connecticut could be mitigated by projected economic growth for the area.

8.2.3.2 Once-Through Cooling System

This section discusses the environmental impacts of constructing a nuclear power plant at the Millstone site using once-through cooling. The impacts (SMALL, MODERATE, or LARGE) of this option are the same as the impacts for a nuclear power plant using a closed-cycle system. However, there are minor environmental differences between the closed-cycle and once-through cooling systems. Table 8-7 summarizes the incremental differences.

8.2.4 Purchased Electrical Power

If available, purchased power from other sources could obviate the need to renew the Millstone OLs. It is unlikely, however, that sufficient base-load, firm power supply would be available to replace the Millstone capacity.

Purchased power accounted for approximately 19.2 terawatt-hours of electricity in 1999, in Connecticut (Dominion 2004). In addition, there is demand for increased power in the region, including Long Island Sound. Therefore, purchased power is reasonable; however, replacing the 2024 MW(e) of power generated by Millstone solely with purchased power and no new generation capacity may not be reasonable in the long term.

Table 8-7. Summary of Environmental Impacts of a New Nuclear Power Plant Sited at the Millstone Site with Once-Through Cooling

Impact Category	Change in Impacts from Once-Through Cooling System
Land Use	Impacts may be less (e.g., through elimination of cooling towers).
Ecology	Impacts would be greater on aquatic ecology at site; potential impacts associated with entrainment of fish and shellfish in early life stages, impingement of fish and shellfish, and heat shock.
Water Use and Quality-Surface Water	Increased water withdrawal leading to possible water use conflicts; thermal load higher than with closed-cycle cooling.
Water Use and Quality-Groundwater	No change
Air Quality	No change
Waste	No change
Human Health	No change
Socioeconomics	No change
Transportation	No change
Aesthetics	Elimination of cooling towers
Historic and Archaeological Resources	No change
Environmental Justice	No change

Imported power from Canada or Mexico is unlikely to be available for replacement of Millstone capacity. In Canada, 60 percent of the country's electrical generation capacity is derived from renewable energy sources, principally hydropower (DOE/EIA 2004b). Canada has plans to continue developing hydroelectric power with more than 6000 megawatts (MW) of hydroelectric capacity either under construction or planned (DOE/EIA 2004b). Canada's nuclear generation is projected to increase by 23 percent by 2025, by bringing four units of Ontario Province's Pickering reactors back into operation over the next several years to assist in replacing coal-fired generation (DOE/EIA 2004b). EIA projects that total gross U.S. imports of electricity from Canada and Mexico will gradually increase from 38.4 billion kWh in year 2001, to

48.9 billion kWh in year 2005, and then gradually decrease to 15.2 billion kWh, in year 2025 (DOE/EIA 2004a). Consequently, it is unlikely that electricity imported from Canada or Mexico would be able to replace Millstone capacity.

If power to replace Millstone capacity were to be purchased from sources within the United States or a foreign country, the generating technology would likely be one of those described in this SEIS and in the GEIS (e.g., coal, natural gas, or nuclear). The description of the environmental impacts of other technologies in Chapter 8 of the GEIS is representative of the purchased electrical power alternative to renewal of the Millstone OLs. Thus, the environmental impacts of imported power would still occur but would be located elsewhere within the region, nation, or another country.

8.2.5 Other Alternatives

Other generation technologies considered by NRC are discussed in the following paragraphs.

8.2.5.1 Wind Power

Wind power, by itself, is not suitable for large base-load electrical generation. As discussed in Section 8.3.1 of the GEIS, wind has a high degree of intermittency, and average annual capacity factors for wind plants are relatively low (less than 30 percent). Wind power, in conjunction with energy storage mechanisms, might serve as a means of providing base-load power. However, current energy storage technologies are too expensive for wind power to serve as a large base-load generator.

The state of Connecticut is in a wind power Class 2 region (average wind speeds at 10-m [30-ft] elevation of 5.6 to 6.4 meters per second (m/s) [18 to 21 feet per second [ft/s]). On the coast, Connecticut is in a wind power Class 3 region (average wind speeds at 10-m [30-ft] elevation of 6.4 to 7.0 m/s [21 to 23 ft/s]) (DOE 2004a). In wind power Class 2 areas wind turbines are economically marginal for development, but in Class 3 areas may be suitable with future technology (DOE 2004a).

There are active wind power facilities in the region, and others are proposed. As of January 2003, there were approximately 48 MW of grid-connected wind power facilities in New York State, with an additional 410 MW of additional capacity in various stages of planning (American Wind Energy Association 2003). In addition, the U.S. Army Corps of Engineers (USACE) is preparing an environmental impact statement for a proposed wind farm to generate 420 MW(e) using 170 turbines off the coast of Massachusetts (USACE 2004).

Access to many of the best land-based wind power sites near the coast likely would require extensive road building, as well as clearing (for towers and blades) and leveling (for the tower

bases and associated facilities) in steep terrain. Also, many of the best quality wind sites are on ridges and hilltops that could have greater archaeological sensitivity than surrounding areas. For these reasons, development of large-scale, land-based wind-power facilities are not only likely to be costly, but could also have MODERATE to LARGE impacts on aesthetics, historic and archaeological resources, land use, and terrestrial ecology.

The offshore wind speeds are higher than those onshore and could thus support greater energy production than onshore facilities. Ten offshore wind power projects are currently operating in Europe, but none have been developed in the United States. The European plants together provide approximately 250 MW(e), which is significantly less than the electrical output of Millstone (British Wind Energy Association 2003). For the preceding reasons, the staff concludes that locating a wind-energy facility on or near the Millstone site, or offshore as a replacement for Millstone generating capacity, is not only likely to be costly, but would also have MODERATE to LARGE impacts on aesthetics, aquatic ecology, and shipping lanes.

8.2.5.2 Solar Power

Solar technologies use the sun's energy and light to provide heat and cooling, light, hot water, and electricity for homes, businesses, and industry. In the GEIS, the staff noted that by its nature, solar power is intermittent. Therefore, solar power by itself is not suitable for base-load capacity and is not a feasible alternative to license renewal of Millstone. The average capacity factor of photovoltaic cells is about 25 percent, and the capacity factor for solar thermal systems is about 25 percent to 40 percent (NRC 1996). Solar power, in conjunction with energy storage mechanisms, might serve as a means of providing base-load power. However, current energy storage technologies are too expensive to permit solar power to serve as a large base-load generator. Therefore, solar power technologies (photovoltaic and thermal) cannot currently compete with conventional fossil-fueled technologies in grid-connected applications, due to high costs per kilowatt of capacity. (NRC 1996).

There are substantial impacts to natural resources (wildlife habitat, land-use, and aesthetic impacts) from construction of solar-generating facilities. As stated in the GEIS, land requirements are high—14,000 ha (35,000 ac) per 1000 MW(e) for photovoltaic and approximately 5700 ha (14,000 ac) per 1000 MW(e) for solar thermal systems. Neither type of solar electric system would fit at the Millstone site, and both would have large environmental impacts at an alternate site.

The Millstone site receives approximately 3 to 3.5 kWh of solar radiation per square meter per day (Dominion 2004), compared to 6 to 8 kWh of solar radiation per square meter per day in areas of the western United States, such as California, which are most promising for solar technologies (DOE/EIA 2000). Because of the natural resource impacts (land and ecological),

the area's relatively low rate of solar radiation, and high cost, solar power is not deemed a feasible base-load alternative to renewal of the Millstone OLs. Some solar power may substitute for electric power in rooftop and building applications. Implementation of nonrooftop solar generation on a scale large enough to replace Millstone would likely result in LARGE environmental impacts.

8.2.5.3 Hydropower

Connecticut has an estimated 43.5 MW(e) of undeveloped hydroelectric resources (Idaho National Environmental and Engineering Laboratory 1995). This amount is far less than would be needed to replace the 2024 MW(e) capacity of Millstone. In Section 8.3.4 of the GEIS, the staff points out that hydropower's percentage of U.S. generating capacity is expected to decline because hydroelectric facilities have become difficult to site as a result of public concern about flooding, destruction of natural habitat, and alteration of natural river courses.

In the GEIS, the staff estimated that land requirements for hydroelectric power are approximately 4.0×10^5 ha (1.0×10^6 ac) per 1000 MW(e). Replacement of Millstone generating capacity would require flooding more than this amount of land. Due to the relatively low amount of undeveloped hydropower resource in Connecticut, and the large land-use and related environmental and ecological resource impacts associated with siting hydroelectric facilities large enough to replace Millstone, the staff concludes that, on its own, local hydropower is not a feasible alternative to renewal of the Millstone OLs. Siting hydroelectric facilities large enough to replace Millstone would result in LARGE environmental impacts.

8.2.5.4 Geothermal Energy

Geothermal energy has an average capacity factor of 90 percent and can be used for base-load power where available. However, geothermal technology is not widely used as base-load electrical generation due to the limited geographical availability of the resource and immature status of the technology (NRC 1996). As illustrated by Figure 8.4 in the GEIS, geothermal plants are most likely to be sited in the western continental United States, Alaska, and Hawaii where hydrothermal reservoirs are prevalent. There is no feasible eastern location for geothermal capacity to serve as an alternative to Millstone. The staff concludes that geothermal energy is not a feasible alternative to renewal of the Millstone OLs.

8.2.5.5 Wood Waste

The use of wood waste to generate electricity is largely limited to those states with significant wood resources, such as California, Maine, Georgia, Minnesota, Oregon, Washington, and Michigan. Electric power is generated in these states by the pulp, paper, and paperboard

industries, which burn wood and wood waste for electrical power generation, benefitting from the use of waste materials that could otherwise represent a disposal problem.

A wood-burning facility can provide base-load power and operate with an average annual capacity factor of around 70 to 80 percent and with 20 to 25 percent efficiency (NRC 1996). The fuels required are variable and site-specific. A significant barrier to the use of wood waste to generate electricity is the high delivered-fuel cost and high construction cost per MW of generating capacity. The larger wood-waste power plants are only 40 to 50 MW(e) in size. Estimates in the GEIS suggest that the overall level of construction impact per MW of installed capacity should be approximately the same as that for a coal-fired plant, although facilities using wood waste for fuel would be built at smaller scales. Like coal-fired plants, wood-waste plants require large areas for fuel storage and waste disposal and involve the same type of combustion equipment.

Due to uncertainties associated with obtaining sufficient wood and wood waste to fuel a base-load generating facility, ecological impacts of large-scale timber cutting (e.g., soil erosion and loss of wildlife habitat), and low efficiency, the staff has determined that wood waste is not a feasible alternative to renewing the Millstone OLs.

8.2.5.6 Municipal Solid Waste

Municipal waste combustors incinerate the waste and use the resultant heat to generate steam, hot water, or electricity. The combustion process can reduce the volume of waste by up to 90 percent and the weight of the waste by up to 75 percent (EPA 2001). Municipal waste combustors use three basic types of technologies: mass burn, modular, and refuse-derived fuel (DOE/EIA 2001). Mass burning technologies are most commonly used in the United States. This group of technologies processes raw municipal solid waste "as is," with little or no sizing, shredding, or separation before combustion.

Growth in the municipal waste combustion industry slowed dramatically during the 1990s after rapid growth during the 1980s. The slower growth was due to three primary factors: (1) the Tax Reform Act of 1986, which made capital-intensive projects such as municipal waste combustion facilities more expensive relative to less capital-intensive waste disposal alternatives such as landfills; (2) the 1994 Supreme Court decision *(C&A Carbone, Inc. v. Town of Clarkstown)*, which struck down local flow control ordinances that required waste to be delivered to specific municipal waste combustion facilities rather than the potentially lower-cost (lower fee) landfills; and (3) increasingly stringent environmental regulations that increased the capital cost necessary to construct and maintain municipal waste combustion facilities (DOE/EIA 2001).

The decision to burn municipal waste to generate energy is usually driven by the need for an alternative to landfills rather than by energy considerations. The use of landfills as a waste disposal option is likely to increase in the near term; however, it is unlikely that many landfills will begin converting waste to energy because of unfavorable economics, particularly with electricity prices declining in real terms. EIA projects that between 1999 and 2020, the average price of electricity in real 1999 dollars will decline by an average of 0.5 percent per year as a result of competition among electricity suppliers (DOE/EIA 2001).

Municipal solid waste combustors generate an ash residue that is buried in landfills. The ash residue is composed of bottom ash and fly ash. Bottom ash refers to that portion of the unburned waste that falls to the bottom of the grate or furnace. Fly ash represents the small particles that rise from the furnace during the combustion process. Fly ash is generally removed from flue-gases using fabric filters and/or scrubbers (DOE/EIA 2001).

Currently there are approximately 102 waste-to-energy plants operating in the United States. These plants generate approximately 2800 MW(e), or an average of approximately 28 MW(e) per plant (Integrated Waste Services Association 2001), much less than needed to replace the 2024 MW(e) of Millstone.

The initial capital costs for municipal solid-waste plants are greater than for comparable steam-turbine technology at wood-waste facilities. This is due to the need for specialized waste-separation and -handling equipment for municipal solid waste (NRC 1996). Furthermore, estimates in the GEIS suggest that the overall level of construction impact from a waste-fired plant should be approximately the same as that for a coal-fired plant. Additionally, waste-fired plants have the same or greater operational impacts (including impacts on the aquatic environment, air, and waste disposal). Some of these impacts would be moderate, but still larger than the environmental impacts of license renewal of Millstone. Therefore, municipal solid waste would not be a feasible alternative to renewal of the Millstone OLs, particularly at the scale required.

8.2.5.7 Other Biomass-Derived Fuels

In addition to wood and municipal solid-waste fuels, there are several other concepts for fueling electric generators, including burning crops, converting crops to a liquid fuel such as ethanol, and gasifying crops (including wood waste). In the GEIS, the staff points out that none of these technologies has progressed to the point of being competitive on a large scale or of being reliable enough to replace a base-load plant such as Millstone. For these reasons, such fuels do not offer a feasible alternative to renewal of the Millstone OLs.

8.2.5.8 Fuel Cells

Fuel cells work without combustion and its environmental side effects. Power is produced electrochemically by passing a hydrogen-rich fuel over an anode and air over a cathode and separating the two by an electrolyte. The only by-products are heat, water, and carbon dioxide. Hydrogen fuel can come from a variety of hydrocarbon resources by subjecting them to steam under pressure. Natural gas is typically used as the source of hydrogen.

Phosphoric acid fuel cells are generally considered first-generation technologies. These fuel cells are commercially available at a cost of approximately $4500 per kilowatt (kW) of installed capacity (DOE 2004b). Higher-temperature, second-generation fuel cells achieve higher fuel-to-electricity and thermal efficiencies. The higher temperatures contribute to improved efficiencies and give the second-generation fuel cells the capability to generate steam for cogeneration and combined-cycle operations.

DOE has a new initiative to reduce costs to as low as $400 per kW by the end of the decade (DOE 2004b). For comparison, the installed capacity cost for a natural gas-fired, combined-cycle plant is about $456 per kW (DOE/EIA 2004a). As market acceptance and manufacturing capacity increase, natural gas-fueled fuel cell plants in the 50- to 100-MW range are projected to become available. At the present time, however, fuel cells are not economically or technologically competitive with other alternatives for base-load electricity generation. Fuel cells are, consequently, not a feasible alternative to renewal of the Millstone OLs.

8.2.5.9 Delayed Retirement

Dominion has no current plans to retire any existing generating units. For this reason, delayed retirement of other Dominion generating units would not be a feasible alternative to renewal of the Millstone OLs.

8.2.5.10 Utility-Sponsored Conservation

Connecticut has state-wide residential, commercial, and industrial programs to reduce both peak demands and daily energy consumption. These programs are commonly referred to as demand-side management. State-wide, these demand-side management programs through 2001 have resulted in peak demand reduction of approximately 63 MW in 2000 (Connecticut State Legislature 2001). These demand-side management-induced load reductions are acknowledged in load forecasts; therefore they cannot be used as credits to offset the power generated by Millstone. An additional 1961 MW(e) of savings would be

required to offset the power generated by Millstone. Therefore, the conservation option by itself is not considered a reasonable replacement for the Millstone OLs renewal alternative.

8.2.6 Combination of Alternatives

Even though individual alternatives to Millstone might not be sufficient on their own to replace Millstone generating capacity due to the small size of the resource or lack of cost-effective technologies, it is conceivable that a combination of alternatives might be cost effective.

As discussed in Section 8.2, Millstone Units 2 and 3 have a combined net summer rating of 2024 MW(e). For the coal and natural gas alternatives, the Dominion ER assumes four and five standard 400-MW(e) units, respectively, as potential replacements for Units 2 and 3. This approach is evaluated in Sections 8.2.1 and 8.2.2 of this SEIS; although it results in some environmental impacts that are somewhat lower than the impacts for full replacement capacity.

There are many possible combinations of alternatives. Some alternatives could include renewable energy sources, such as wind power. Table 8-8 contains a summary of the environmental impacts of one assumed combination of alternatives consisting of 1000 MW(e) of combined-cycle natural gas-fired generation using once-through cooling, an additional 524 MW(e) from purchased power, and 500 MW(e) gained from additional demand-side management measures. The impacts are based on the gas-fired generation impact assumptions discussed in Section 8.2.2, adjusted for the reduced generating capacity. While the demand-side management measures would have few environmental impacts, operation of the new gas-fired plant would result in increased emissions and environmental impacts. The staff concludes that it is very unlikely that the environmental impacts of any reasonable combination of generating and conservation options could be reduced to the level of impacts associated with renewal of the Millstone OLs.

Table 8-8. Summary of Environmental Impacts of 1000 MW(e) of Natural Gas-Fired Generation, 524 MW(e) from Purchased Power and 500 MW(e) from Demand-Side Management Measures

	Millstone Site		Alternate Site	
Impact Category	**Impact**	**Comments**	**Impact**	**Comments**
Land Use	SMALL to MODERATE	22 ha (55 ac) for power-block, offices, roads, and parking areas. Additional impact for construction of an underground gas pipeline.	SMALL to MODERATE	22 ha (55 ac) for power-block, offices, roads, and parking areas. Additional impact for construction and/or upgrade of an underground gas pipeline.

Table 8-8. (contd)

	Millstone Site		Alternate Site	
Impact Category	Impact	Comments	Impact	Comments
Ecology	SMALL to MODERATE	Uses undeveloped areas at current Millstone site, plus gas pipeline. Small impacts to aquatic resources since less cooling water required.	SMALL to MODERATE	Impact depends on location and ecology of the site, surface water body used for intake and discharge, and pipeline routes; potential habitat loss and fragmentation; reduced productivity and biological diversity. Likely plant sites already have power-generation facilities.
Water Use and Quality—Surface Water	SMALL	Uses existing intake and discharge structures. Less water use, since closed-cycle cooling system replaces once-through system.	SMALL to MODERATE	Impact depends on volume of water withdrawal and discharge and characteristics of surface-water body.
Water Use and Quality—Groundwater	SMALL	Millstone uses little groundwater.	SMALL to MODERATE	Impact depends on volume of water withdrawal and discharge.
Air Quality	MODERATE	Natural Gas-Fired Units Sulfur oxides • 68 MT/yr (75 tons/yr) Nitrogen oxides • 256 MT/yr (282 tons/yr) Carbon monoxide • 336 MT/yr (370 tons/yr) PM_{10} particulates • 100 MT/yr (110 tons/yr) Some hazardous air pollutants Some hazardous air pollutants. Additional emissions from producers of purchased power.	MODERATE	Same as siting at Millstone
Waste	SMALL	Small amount of ash produced from gas-fired plan.	SMALL	Same as siting at Millstone.
Human Health	SMALL	Impacts would be minor.	SMALL	Impacts would be minor.

Table 8-8. (contd)

Impact Category	Millstone Site		Alternate Site	
	Impact	Comments	Impact	Comments
Socioeconomics	SMALL to MODERATE	During construction, impacts would be MODERATE. Up to 1000 additional workers during the peak of the three-year construction period, followed by reduction from current Millstone workforce of 1650 to 55; tax base preserved. Impacts during operation would be SMALL.	SMALL to MODERATE	Construction impacts depend on location, but could be significant if location is in a more rural area than Millstone. City of Waterford would experience loss of tax base and employment, potentially offset by possible economic growth.
Transportation	MODERATE	Transportation impacts associated with construction workers would be MODERATE.	MODERATE	Transportation impacts associated with construction workers would be MODERATE.
Aesthetics	MODERATE	MODERATE aesthetic impacts due to plant units and stacks.	SMALL to MODERATE	Impact would depend on location. Similar to Millstone if sited on retired oil-fired plant site.
Historic and Archaeological Resources	SMALL	Studies would likely be needed to identify, evaluate, and address mitigations of the potential impacts from construction and operation. Any potential impacts can likely be effectively managed.	SMALL	Same as Millstone.
Environmental Justice	SMALL to MODERATE	Impacts on minority and low-income communities should be similar to those experienced by the population as a whole. Some impacts on housing may occur during construction; loss of 1595 operating jobs at Millstone could reduce employment prospects for minority and low-income populations. Impacts could be offset by potential economic growth and the ability of affected workers to commute to other jobs.	SMALL to MODERATE	Impacts vary depending on population distribution and make-up at site.

8.3 Summary of Alternatives Considered

The environmental impacts of the proposed action, license renewal, would be SMALL for all impact categories except entrainment, which would be MODERATE (other exceptions include collective off-site radiological impacts from the fuel cycle and from high-level waste and spent fuel disposal, for which a single significance level was not assigned). The alternative actions, i.e., no-action alternative (discussed in Section 8.1), new generation alternatives (from coal, natural gas, and nuclear discussed in Sections 8.2.1 through 8.2.3, respectively), purchased electrical power (discussed in Section 8.2.4), alternative technologies (discussed in Section 8.2.5), and the combination of alternatives (discussed in Section 8.2.6) were considered.

The no-action alternative would require the replacement of electrical generating capacity by (1) demand-side management and energy conservation, (2) power purchased from other electricity providers, (3) generating alternatives other than Millstone, or (4) some combination of these options. For each of the new generation alternatives (coal, natural gas, and nuclear), the environmental impacts would not be less than the impacts of license renewal. For example, the land-disturbance impacts resulting from construction of any new facility would be greater than the impacts of continued operation of Millstone. The impacts of purchased electrical power (imported power) would still occur, but would occur elsewhere. Alternative technologies are not considered feasible at this time, and it is very unlikely that the environmental impacts of any reasonable combination of generation and conservation options could be reduced to the level of impacts associated with renewal of the Millstone OLs.

The staff concludes that the alternative actions, including the no-action alternative, may have environmental impacts in at least some impact categories that reach MODERATE or LARGE significance.

8.4 References

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

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

10 CFR Part 52. Code of Federal Regulations, Title 10, *Energy*, Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants."

40 CFR Part 51. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 51, "Requirements for Preparation, Adoption, and Submittal of Implementation Plans."

40 CFR Part 60. Code of Federal Regulations, Title 40, *Protection of Environment*, Part 60, "Standards of Performance for New Stationary Sources."

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

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9.0 Summary and Conclusions

By letter dated January 20, 2004, Dominion Nuclear Connecticut, Inc. (Dominion) submitted applications to the U.S. Nuclear Regulatory Commission (NRC) to renew the operating licenses (OLs) for Millstone Power Station, Units 2 and 3 (Millstone), for an additional 20-year period (Dominion 2004a). If the OLs are renewed, State regulatory agencies and Dominion 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 in July 2015 for Unit 2 and November 2025 for Unit 3.

Section 102 of the National Environmental Policy Act (NEPA) (42 United States Code [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 Title 10 of the Code of Federal Regulations (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 Plants* (GEIS), NUREG-1437, Volumes 1 and 2 (NRC 1996; 1999).[a]

Upon acceptance of the Dominion 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 (69 FR 18409 [NRC 2004a]) on April 7, 2004. The staff visited the Millstone site in May 2004 and held public scoping meetings on May 18, 2004, in Waterford, Connecticut (NRC 2004b). The staff reviewed the Dominion Environmental Report (ER; Dominion 2004b) 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 2000). The staff also considered the public comments received during the scoping process for preparation of the draft Supplemental Environmental Impact Statement (SEIS) for Millstone. 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 held two public meetings in Waterford, Connecticut, in January 2005, to describe the preliminary results of the NRC environmental review and to answer questions, in order to provide members of the public with information to assist them in formulating their comments on

(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 draft SEIS. The staff considered and addressed all of the comments received on the draft SEIS. These comments are recorded and addressed in Appendix A, Part 2, of this SEIS.

This SEIS includes the NRC staff's analysis, which considers and weighs the cumulative impacts of the action, 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 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]

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 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 likely not to be sufficiently beneficial to warrant implementation.

(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."

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.

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 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 Millstone) and alternative methods of power generation. These alternatives were evaluated assuming that the replacement power generation plant is located at either the Millstone site or some other unspecified greenfield location.

9.1 Environmental Impacts of the Proposed Action—License Renewal

Dominion 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 Dominion 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 public comments, Dominion, nor the staff has identified any new issue, applicable to Millstone, 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 Millstone.

Dominion's license renewal applications present an analysis of the Category 2 issues that are applicable to Millstone, plus environmental justice and chronic effects from electromagnetic fields. The staff has reviewed the Dominion analysis for each issue and has conducted an independent review of each issue plus environmental justice and chronic effects from electromagnetic fields. Six Category 2 issues are not applicable because they are related to plant design features or site characteristics not found at Millstone. Four Category 2 issues are not discussed in this SEIS because they are specifically related to refurbishment. Dominion (Dominion 2004b) 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 Millstone 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 the bounds of the plant operations evaluated in the U.S. Atomic Energy Commission's 1973 *Final Environmental Statement Related to the Continuation of Construction of Unit 2 and the Operation of Units 1 and 2, Millstone Nuclear Power Station* and in the NRC's 1984 *Final Environmental Statement related to operation of Millstone Nuclear Power Station, Unit No. 3.*

Eleven 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 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 SEIS in relation to operation during the renewal term. For 10 Category 2 issues and environmental justice, the staff concludes that the potential environmental impacts would be of SMALL significance in the context of the standards set forth in the GEIS. For entrainment, the staff concludes that the potential environmental impacts would be of MODERATE 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 Millstone and the plant improvements already made, the staff concludes that one of the candidate SAMAs is cost beneficial for Unit 2. One additional SAMA for each unit could be cost beneficial if it can be implemented by severe accident management guidelines without hardware modifications. None of these SAMAs relate to adequately managing the effects of aging during the period of extended operation. Therefore, they need not be implemented as part of license renewal pursuant to 10 CFR Part 54.

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. The Connecticut Department of Environmental Protection is currently reviewing Dominion's National Pollutant Discharge Elimination System permit application. The Connecticut Department of Environmental Protection may identify mitigations to further minimize entrainment as a condition of the permit.

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 with the exception of a MODERATE impact for entrainment, and none warrants implementation of additional mitigation measures. The adverse impacts of likely alternatives if Millstone Units 2 and 3 cease 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 Millstone, Units 2 and 3 during the current license period was made when the plants were built. The resource commitments to be considered in this SEIS are associated with continued operation of the plants 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. Dominion replaces approximately one-third of the fuel assemblies in each of the two units during every refueling outage, which occurs on an 18-month cycle.

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

9.1.3 Short-Term Use Versus Long-Term Productivity

An initial balance between short-term use and long-term productivity of the environment at the Millstone site was set when the plants were approved and construction began. That balance is

now well established. Renewal of the OLs for Millstone Units 2 and 3 and continued operation of the plants 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 plants and will alter the balance in a manner that depends on subsequent uses of the site. For example, the environmental consequences of turning the Millstone 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 Millstone. Chapter 2 describes the site, power plants, and interactions of the plants with the environment. As noted in Chapter 3, no refurbishment and no refurbishment impacts are expected at Millstone. 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 applications), alternatives involving coal, gas, or nuclear generation of power at the Millstone site and an unspecified "greenfield site"— and a combination of alternatives—are compared in Table 9-1. Continued use of a once-through cooling system for Millstone is assumed for Table 9-1.

Use of a closed-cycle cooling system is assumed for alternatives to the proposed action (Table 9-1). Substitution of once-through cooling for a closed-cycle cooling system in the evaluation of the nuclear, gas-, and coal-fired generation alternatives would result in somewhat greater environmental impacts in some impact categories.

Table 9-1 shows that the significance of the environmental impacts of the proposed action would be SMALL for all impact categories except for entrainment, which would be MODERATE, and for collective offsite radiological impacts from the fuel cycle and from high-level waste 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 impacts in at least some impact categories that reach MODERATE or LARGE significance.

Table 9-1. Summary of Environmental Significance of License Renewal, the No-Action Alternative, and Alternative Methods of Energy Generation

	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	Millstone Site	Alternate Site	Millstone Site	Alternate Site	Millstone Site	Alternate Site	Millstone Site	Alternate Site
Land Use	SMALL	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	MODERATE	MODERATE to LARGE	SMALL to MODERATE	SMALL to MODERATE
Ecology	SMALL to MODERATE	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE
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 MODERATE	SMALL	SMALL to MODERATE
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
Socioeconomics	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to LARGE	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL to LARGE	SMALL to MODERATE	SMALL to MODERATE
Socioeconomics (Transportation)	SMALL	SMALL	SMALL to LARGE	SMALL to LARGE	SMALL to MODERATE	SMALL to MODERATE	SMALL to LARGE	SMALL to LARGE	MODERATE	MODERATE
Aesthetics	SMALL	SMALL	MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	MODERATE	SMALL to MODERATE	MODERATE	SMALL to MODERATE
Historic and Archaeological Resources	SMALL	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL	SMALL
Environmental Justice	SMALL	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE	SMALL	SMALL to MODERATE	SMALL to MODERATE	SMALL to MODERATE

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

9.3 Staff Conclusions and Recommendations

Based on (1) the analysis and findings in the GEIS (NRC 1996; 1999), (2) the ER submitted by Dominion (Dominion 2004b), (3) consultation with Federal, State, and local agencies, (4) the staff's own independent review, and (5) the staff's consideration of public comments, the recommendation of the staff is that the Commission determine that the adverse environmental impacts of license renewal for Millstone are not so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable.

9.4 References

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

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

Dominion Nuclear Connecticut, Inc. (Dominion). 2004a. *Application for Renewed Operating Licenses, Millstone Power Station, Units 2 and 3.* Waterford, Connecticut.

Dominion Nuclear Connecticut, Inc. (Dominion). 2004b. *Applicant's Environmental Report – Operating License Renewal Stage Millstone Power Station, Units 2 and 3.* Waterford, Connecticut.

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

U.S. Atomic Energy Commission. 1973. *Final Environmental Statement Related to the Continuation of Construction of Unit 2 and the Operation of Units 1 and 2, Millstone Nuclear Power Station.* Docket Nos. 50-245 and 50-336, Washington D.C.

U.S. Nuclear Regulatory Commission (NRC). 1984. *Final Environmental Statement Related to the Operation of Millstone Nuclear Power Station, Unit No. 3.* Docket No. 50-423, Washington, D.C.

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, Vol. 1, Addendum 1, Washington, D.C.

U.S. Nuclear Regulatory Commission (NRC). 2000. *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). 2004a. "Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process." *Federal Register*, Vol. 69, No 67, pp 18409–18410. Washington, D.C. (April 7, 2004).

U.S. Nuclear Regulatory Commission (NRC). 2004b. *Environmental Impact Statement Scoping Process: Summary Report – Millstone Power Station, Units 2 and 3, New London County, Connecticut.* Washington, D.C. August 27, 2004.

Appendix A

Comments Received on the Environmental Review

Appendix A

Comments Received on the Environmental Review

Part I - Comments Received During Scoping

On April 7, 2004, the U.S. Nuclear Regulatory Commission (NRC) published a Notice of Intent in the *Federal Register* (69 FR 18409), to notify the public of the staff's intent to prepare a plant-specific supplement to the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), NUREG-1437, Volumes 1 and 2, to support the renewal applications for the Millstone operating licenses and to conduct scoping. The plant-specific supplement to the GEIS has been prepared in accordance with the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) guidance, and 10 CFR Part 51. As outlined by NEPA, the NRC initiated the scoping process with the issuance of the *Federal Register* Notice. The NRC invited the applicant; Federal, State, and local government agencies; Native American tribal organizations; local organizations; and individuals to participate in the scoping process by providing oral comments at the scheduled public meetings and/or submitting written suggestions and comments no later than June 4, 2004.

The scoping process included two public scoping meetings, which were held at the Town Hall in Waterford, Connecticut on May 18, 2004. Approximately 95 members of the public attended the meetings. Both sessions began with NRC staff members providing a brief overview of the license renewal process and the NEPA process. After the NRC's prepared statements, the meetings were open for public comments. Thirty-three attendees provided oral statements that were recorded and transcribed by a certified court reporter and written statements that were appended to the transcript. The meeting transcripts are an attachment to the Scoping Meeting Summary dated June 24, 2004. In addition to the comments received during the public meetings, eight comment letters or email messages were received by the NRC in response to the Notice of Intent.

The NRC received an email dated September 7, 2004, from Mr. Michael Steinberg providing clarification to comments made during the scoping meeting. Because this comment was received well after the scoping process had ended, it was not included in the scoping summary report. However, the staff did consider the comment in the preparation of this supplemental environmental impact statement (SEIS).

At the conclusion of the scoping period, the NRC staff and its contractor(s) reviewed the transcripts and letters to identify specific comments and issues. Each set of comments from a given commenter was given a unique identifier (Commenter ID), so that each set of comments from a commenter could be traced back to the transcript or letter by which the comments were submitted. Specific comments were numbered sequentially within each comment set. Several

commenters submitted comments through multiple sources (e.g., afternoon and evening scoping meetings). All of the comments received and the staff responses are included in the Millstone Scoping Summary Report dated August 27, 2004.

Table A.1 identifies the individuals who provided comments applicable to the environmental review and the Commenter ID associated with each person's set(s) of comments. The individuals are listed in the order in which they spoke at the public meeting, and in alphabetical order for the comments received by letter or e-mail. To maintain consistency with the Scoping Summary Report, the unique identifier used in that report for each set of comments is retained in this appendix.

Specific comments were categorized and consolidated by topic. Comments with similar specific objectives were combined to capture the common essential issues raised by the commenters. The comments fall into one of the following general groups:

- Specific comments that address environmental issues within the purview of the NRC environmental regulations related to license renewal. These comments address Category 1 or Category 2 issues or issues that were not addressed in the GEIS. They also address alternatives and related Federal actions.

- General comments (1) in support of or opposed to nuclear power or license renewal or (2) on the renewal process, the NRC's regulations, and the regulatory process. These comments may or may not be specifically related to the Millstone license renewal applications.

- Questions that do not provide new information.

- Specific comments that address issues that do not fall within or are specifically excluded from the purview of NRC environmental regulations related to license renewal. These comments typically address issues such as the need for power, emergency preparedness, security, current operational safety issues, and safety issues related to operation during the renewal period.

Table A.1. Individuals Providing Comments During Scoping Comment Period

Commenters ID	Commenter	Affiliation (If Stated)	Comment Source and ADAMS Accession Number[a]
MS-A	Gerald Gaynor Jr.	Mayor, City of New London	Afternoon Scoping Meeting
MS-B	Mr. Fraser	First Selectman, Town of East Lyme	Afternoon Scoping Meeting
MS-C	Melodie Peters	CT State Senator	Afternoon Scoping Meeting
MS-D	Andrea Stillman	CT State Representative	Afternoon Scoping Meeting
MS-E	Richard Brown	City Manager, City of New London	Afternoon Scoping Meeting
MS-F	Steve Scace	Director of Safety and Licensing, Millstone	Afternoon Scoping Meeting
MS-G	Mr. Medeiros	Commercial Fisherman	Afternoon Scoping Meeting
MS-H	Mr. Maderia	Commercial Fisherman	Afternoon Scoping Meeting
MS-I	Nancy Burton	Spokesperson for the Connecticut Coalition Against Millstone	Afternoon Scoping Meeting
MS-J	Don Klepper-Smith	Data Core Partners, LLC	Afternoon Scoping Meeting
MS-K	Stephen Negri	Local Resident	Afternoon Scoping Meeting
MS-L	Brigadier General Zembrzuski	Deputy General, Connecticut National Guard	Afternoon Scoping Meeting
MS-M	John Markowicz	Executive Director, Southeastern CT Enterprise Region	Afternoon Scoping Meeting
MS-N	Susan McNamara	Executive Director, Long Island Sound Foundation	Afternoon Scoping Meeting
MS-O	Tony Sheridan	President, Chamber of Commerce of Eastern CT	Afternoon Scoping Meeting
MS-P	Evan Woollacott	Co-Chairman, CT Nuclear Energy Advisory Council	Afternoon Scoping Meeting
MS-Q	Paul Eccard	First Selectman, Town of Waterford	Evening Scoping Meeting
MS-R	Janet Dinkel Pearce	President, United Way of Southeastern CT	Evening Scoping Meeting
MS-S	James Butler	Executive Director, Southeastern CT Council of Government	Evening Scoping Meeting
MS-T	Steve Scace	Director of Safety and Licensing, Millstone	Evening Scoping Meeting
MS-U	Marvin Berger	Local resident	Evening Scoping Meeting
MS-V	Geraldine Winslow	Local resident	Evening Scoping Meeting
MS-W	Pete Reynolds	Local resident	Evening Scoping Meeting

Commenters ID	Commenter	Affiliation (If Stated)	Comment Source and ADAMS Accession Number[a]
MS-X	Michael Steinberg	Local resident	Evening Scoping Meeting
MS-Y	Mr. Schwartz	Local resident	Evening Scoping Meeting
MS-Z	John "Bill" Sheehan	Vice Chairman, CT Nuclear Energy Advisory Council	Evening Scoping Meeting
MS-AA	Tony Sheridan	President, Chamber of Commerce of Eastern CT	Evening Scoping Meeting
MS-AB	George Kee	Local resident	Evening Scoping Meeting
MS-AC	JQ	Local resident	Evening Scoping Meeting
MS-AD	John Markowicz	Executive Director, Southeastern CT Enterprise Region & Co-Chairman, CT Nuclear Energy Advisory Council	Evening Scoping Meeting
MS-AE	Fred W. Thiele, Jr.	Member, Assembly of the State of New York	Letter (ML041620373)
MS-AF	Lucille C. Malouche	Local resident	Letter (ML041620380)
MS-AG	Hortense and Ralph Carpentier	Local resident	Letter (ML041770288)
MS-AH	Charles D. Stephani	Local resident	Letter (ML041770290)
MS-AI	Douglas Schwartz	Local resident	Letter (ML041770175)
MS-AJ	Kelly L. Streich	Local resident	Letter (ML041770177)
MS-AK	Michael Steinberg	Local resident	Letter (ML041770179)
MS-AL	Nancy Burton	Spokesperson for the Connecticut Coalition Against Millstone	Letter (ML041770182)

(a) The accession number for the afternoon transcript is ML041740756.
The accession number for the evening transcript is ML041740767.
The accession number for the attachments to the evening transcript is ML041750500.

Comments applicable to this environmental review and the staff's responses are summarized in this appendix. The parenthetical alpha-numeric identifier after each comment refers to the comment set (Commenter ID) and the comment number. This information, which was extracted from the Millstone Scoping Summary Report, is provided for the convenience of those interested in the scoping comments applicable to this environmental review. The comments that are general or outside the scope of the environmental review for Millstone are not included here. More detail regarding the disposition of general or inapplicable comments can be found in the

summary report. The ADAMS accession number for the Scoping Summary Report is ML041830272.

This accession number is provided to facilitate access to the document through the Public Electronic Reading Room (ADAMS) http://www.nrc.gov/reading-rm.html.

Comments in this section are grouped into the following categories:

1. Surface Water Quality and Use
1. Aquatic Ecology
2. Air Quality
3. Socioeconomics
4. Land Use
5. Human Health
6. Uranium Fuel Cycle and Waste Management
7. Postulated Accidents
8. Alternatives

Part I. Comments Received During Scoping

1. Surface Water Quality and Use

Comment: They've been operating with an invalid permit that expired in 1997 to discharge these chemicals. If they were to go to a closed system which they know about, they would not be killing these fish and other things that are going in there and they wouldn't have to use this chemical to clean it either.
(MS-G-3)

Comment: I want to briefly discuss the issue of the Clean Water Act. Under the Federal Clean Water Act, this facility requires a valid permit to take in the billions of gallons of water per day that it needs to keep the reactors from melting down and to flush out chemicals into the sea. The organization that I'm affiliated with has brought this issue to various legal public fora. We have demonstrated without any doubt that the permit is not valid. Not only that, the information that Dominion has submitted to the NRC is incorrect. It relies upon submission of materials suggesting that the company has obtained lawful permits to do what it has been doing to the environment which, as you have heard, has been devastating to the indigenous winter flounder.
(MS-I-5)

Comment: Second, the fact that the Millstone Point Station has not received a renewal of the discharge permit from the Department of Environmental Protection is of considerable concern.
(MS-Q-4)

Comment: It is essential that the approval by the Department of Environmental Protection of the NPDES renewal application occur prior to granting the application for relicensing in my view. This concern is further reinforced by the fact that the plant operates at variance with the Clean Water Act as approved by the Commission of the Connecticut Department of Environmental Protection.
(MS-Q-6)

Comment: Eighth, the license renewal process concerns me in that it fails to include a description of the changes that have occurred since the initial license was issued; things like the harvesting of shellfish from Jordan Cove, which has been conditionally open, and the impact of the installation of a new water line to the site and the result in changing consumption rates. I anticipate that both of these changes and conditions will be carefully explored during this process.
(MS-Q-13)

Comment: The discharge permit, it's been an issue since 1993. It was brought up in 1997. It's been brought up at several meetings of the EPUC, the City Council, the Environmental Protection Agency. They are still operating under emergency discharge.
(MS-W-7)

Comment: These facts require the U.S. Nuclear Regulatory Commission to consider the prospect of its relicensing of Millstone nuclear reactors when the reactors are being operated in continuing flagrant violation of the federal Clean Water Act.
(MS-AL-1)

Response: *The comments are related to the status of Dominion's application for a revised National Pollutant Discharge Elimination System (NPDES) permit for Millstone and Millstone's compliance with the Clean Water Act. The Connecticut Department of Environmental Protection (CTDEP) is responsible for the review and issuance of NPDES permits in Connecticut. CTDEP is also responsible for implementation of the Clean Water Act in Connecticut. The NRC does not have authority over matters concerning discharge permits or compliance with the Clean Water Act. The comments provide no new and significant information; therefore, the comments will not be evaluated further. The status of Dominion's NPDES permit application will be discussed in Chapters 2 and 4 of the SEIS.*

Comment: Dominion also has been exploring ideas for creative ways to deal with watershed management aside from the obligations that they are going to be held to in the reissuing of their permit.
(MS-C-5)

Comment: The other thing is when the cooling system when they discharge, they discharge hydrazine which is cancer-causing chemical that causes cancer in fish and probably humans too.
(MS-G-2)

Comment: Seventh, does Millstone Point Station sample the sediments in Jordan Cove? Are there radioactive deposits identified in these sediments? What are they and in what quantity do they exist?
(MS-Q-12)

Comment: Those plants contribute to global warming and it increases the temperature of the water used in the cooling. One million gallons per minute of Long Island Sound are sucked in and out of that power, each plant, so that would be times two for Millstone. Many compounds, radiological and industrial chemicals like hydrazine, are discharged routinely.
(MS-V-3)

Comment: The potential accumulation of Hydrazine and Uranium in our local waters and marine life is deeply troubling and presents a serious hazard to public health. It is critical to the protection of our natural resources and the public health that we investigate the extent of the pollution and, most importantly, target the source to eliminate further discharge of these deadly toxins into our waters.
(MS-AE-3)

Comment: I encourage you to request further information from me as will assist your environmental analysis. For example, the Connecticut Coalition Against Millstone presented testimony of an expert in chemistry in a Connecticut Superior Court proceeding in which the expert testified about the synergistic effects of toxic chemical and radioactive waste byproduct releases to the Millstone environment.
(MS-AL-3)

Response: *The comments are related to water quality issues. Water quality, water use, and other water issues were evaluated in the GEIS and determined to be Category 1 issues. The comments provide no new and significant information on water quality; therefore, the comments will not be evaluated further. Water quality will be discussed in Chapters 2 and 4 of the SEIS.*

2. Aquatic Ecology

Comment: ... I was hoping that the present environment could be with the algae surrounding the power plant and other things could be studied more thoroughly in the upcoming weeks and months ahead.
(MS-AC-1)

Response: *The comment is related to aquatic ecology issues. Aquatic ecology issues such as stimulation of nuisance organisms, such as algae, were evaluated in the GEIS and determined to be Category 1 issues. The comments provide no new and significant information on aquatic ecology; therefore, the comments will not be evaluated further. Aquatic ecology will be discussed in Chapters 2 and 4 of the SEIS.*

Comment: And more recently, we've heard about the depletion of winter flounder and some of the other fisheries with respect to the watershed. And I have been involved in discussions with the Department of Environmental Protection in the State and Dominion in trying to move forward with an appropriate approach to how the reactors are being cooled and its impact on the fisheries. That, I understand, from one of your colleagues has something that has been somewhat unresolved since the late `90s in that is as much as a problem or more of a problem with the state environmental protection and their scheduling.
(MS-C-4)

Comment: In the past few years, we haven't been able to go there and that's mainly because there is no fish there anymore. Now the reason for that is because of the cooling system that Millstone uses to cool their reactors. They have an entrainment where they take in millions and millions and billions of little baby fish and whatever else there is and they kill them. The result is we have no fish anymore.
(MS-G-1)

Comment: You're really talking about livelihood of people, maybe people's lives or you're talking about some monetary figure that could take care of this whole problem. I think the only way to do this is to shut them down and make them change their system over to a closed system and that would be the only way that I would agree to renewing the permit.
(MS-G-4)

Comment: We have both have a lawsuit that's in the works against Millstone against this killing of winter flounder.
(MS-H-1)

Comment: We did a test there in the middle of May last year at the peak of the flounder season. We used to do seven bushels there so the tow that we towed, we had seven fish in

count. That's not a tribute to the mesh size in the new Federal laws. That's a tribute to the lack of fish there. I'd like to see a closed system go because I want to get to this problem before they are depleted. The way we're going, they will be totally extinct in Niantic Bay. It's not overfishing. I've heard this for years. And we stopped fishing there approximately seven years ago and it's worse now than it was before. I don't want to hear "all the fishing." I'm sick of it. We get blamed for a lot. We don't do it. It's time that the public realizes that maybe now the Government should start looking at other things besides the fishing, pollution, this hydrazine, everything. ... Let's go to a closed system. The money that it's cost us, the fishermen and resources, that money could have been well spent to put a closed system in.
(MS-H-2)

Comment: When Northeast Utilities applied to the NRC, initially to the Atomic Energy Commission, to operate, it made certain predictions of the effects that the operations would have over time in the community but never predicted, at least on paper to the NRC, that it would have the devastating effect that it has had which is to drive the indigenous fish to a point of near extinction.
(MS-I-6)

Comment: The outstanding issue on renewal of the discharge permit is not limited to thermal discharge. Although not described in Section 4, the issue of the impact of the plant on the Flounder population is the focus of a disagreement between Dominion Nuclear Connecticut and the Department of Environmental Protection.
(MS-Q-7)

Comment: The long-term impacts of discharging two billion gallons of water daily into the Long Island Sound cannot yet be determined and such discharge should cease until a proper and thorough examination of its effects can be measured before the facility is permitted to operate into the future. Such as examination of the power station's impacts should include, but not be limited to, aquatic organisms and the larger marine ecosystem. An analysis must also consider the cumulative impact of the facility upon Long Island.
(MS-AE-2)

Comment: The EIS should present a comprehensive evaluation of the impact of Millstone's water intake (used for cooling purposes) from Niantic Bay on both nektonic and planktonic species. As well as a consideration of economically important species (ie. winter flounder), the EIS should assess the mortality of species that support ecosystem functions (i.e. trophic dynamics). Such species may be significant to the life cycle of other economically important species.
(MS-AJ-1)

Comment: An evaluation of abotic and biotic interactions may be appropriate if the water intake results in modification of the hydrodynamics of Niantic Bay.
(MS-AJ-2)

Comment: The intake structures of the Millstone reactors are recognized as a significant, if not predominant, contributor to the collapse of the indigenous winter flounder population in the Niantic River-Bay. I encourage you to enquire of the Marine Fisheries Division of the Connecticut Department of Environmental Protection, located in Old Lyme, as to its analysis of this phenomenon.
(MS-AL-2)

Response: *The comments are related to aquatic ecology issues. Aquatic ecology will be discussed in Chapters 2 and 4 of the SEIS.*

3. Air Quality

Comment: ... Connecticut and especially, I would venture to say the shore line, Connecticut unfortunately receives the air quality from the Midwest and we don't need fossil fuel plants adding to the problems here in Connecticut in terms of air quality. Nuclear power is a cleaner source of electricity and I would state that it is something that if it is working well, we should continue to promote it here in this region and I believe it is working well.
(MS-D-5)

Comment: Millstone produces all of this electricity using nuclear fuel which does not generate the emissions to the air that are typical to other sources of electricity.
(MS-T-1)

Response: *The comments are related to air quality issues. Air quality issues were evaluated in the GEIS and determined to be Category 1 issues. The comments provide no new and significant information on air quality; therefore, the comments will not be evaluated further.*

4. Socioeconomics

Comment: Dominion has been at the table problem-solving looking for new ways to make this community feel as though they're protected and they're comfortable. They've made huge financial contributions as the Mayor suggested, often times, often times unsolicited with respect to education foundations, the Lion's Club, the children's museum. There's a host of contributions that they've made to improve the quality of life in our region.
(MS-C-6)

Response: *The comment is related to public services impacts in education, social services, and recreation. Public services involving education, social services, and recreation were evaluated in the GEIS and were determined to be Category 1 issues. The comment provides no new and significant information on these public service issues; therefore, the comment will not be evaluated further.*

Comment: ... I am here because this plant is a regional asset whose benefits are received by all of us in Southeastern Connecticut and New England for that matter.
(MS-A-2)

Comment: The construction and the operation of this plant have been a huge part of regional economy for more than 40 years and one that we need to protect for the planned license extension of another 20 years.
(MS-A-3)

Comment: I really feel that the business to provide electricity in Southeastern Connecticut is so important because it's such a major part of the State of Connecticut that the economic concerns that I can draw to right here, as the Mayor of New London also said, is huge to our area as they try their best to support our local businesses with purchases of goods and materials and that their commitment and their word is excellent.
(MS-B-4)

Comment: Electricity is becoming a rare commodity and the fact that we have Dominion supplying as much of the electricity as they have has kept our lights on in this state, a case in point in the recent brownouts that were triggered from someplace off in Ohio. We in Southwestern Connecticut lost our lights. We have transmission problems in south and we have congestion problems, but if it weren't for the fact that Dominion was up and generating in a safe manner our lights would have gone down all over the state and we would have been down the sinkhole as much as New York was in.
(MS-C-2)

Comment: This plant provides a large part of not only Waterford's tax base - I venture to say less than it did because of the of the electric restructuring, but it also provides to the tax base for the State of Connecticut.
(MS-D-2)

Comment: When you look at the fact as was mentioned that more than 45 percent of the electricity that's generated here supports the State of Connecticut, we all know what that means for business.
(MS-D-3)

Comment: We cannot forget what an important part of the economy Millstone is.
(MS-D-4)

Comment: ... not only contributes to the regional economy, but is a major supplier of power in Connecticut and the Northeast. Dominion Resources through Millstone Power Station is a major employer with over 460 persons employed within Southeastern Connecticut. Additionally, Millstone supports the local economy by purchasing as many goods and services locally as possible. The total economic impact of Millstone Power Station in New London County is estimated to exceed $500 million.
(MS-E-2)

Comment: Renewal of the Millstone operating licenses will continue the benefits our employees provide for our local community. Millstone has approximately 1,300 full-time employees. The annual payroll, including benefits, is over $150 million. More 250 local contractors work at Millstone and live in our community. During our regularly scheduled refueling outages, the number of contractors increases by about 800. Each reactor is refueled every 18 months. During the past two years, Millstone spent over $170 million on operations and capital projects, making vital investments in the future of our state.
(MS-F-1)

Comment: As our economy and the population grow, reliable sources of electricity including Millstone will be vital to our prosperity and our way of life. License renewal will help ensure Millstone remains available to meet these future needs.
(MS-F-3)

Comment: We have incentive within the State of Connecticut to keep the costs of doing business down. Clearly cost effective nuclear power has a role to play in keeping the cost of doing business under control. Our study pointed out, when we looked at production costs for electricity by fuel generation type, that nuclear power was clean. It was safe, and it was the most cost effective alternative. It was 30 percent cheaper than gas, 33 percent cheaper than oil, and actually less than coal without the environmental issues. A key point from our study was that Millstone Station provides cost effective power which in turn is essential to the state's long-term economic competitiveness.
(MS-J-1)

Comment: ... our study concluded that Millstone Station had positive and substantial economic benefits for the local area economy. Our study showed that there were 1,497 direct jobs

associated with Millstone Station generating $231.3 million in annualized direct spending. Accounting for multiplier effects, the level of spending, both direct and indirect, was about $500 million. So again, looking at these dollar volumes and the jobs generated, the economic impact was substantial and very, very clearly beneficial.
(MS-J-2)

Comment: Our bottom line conclusions were that Millstone Station provides cost effective and reliable electricity to the region's commercial, industrial, and residential users enhancing Connecticut's economic competitiveness.
(MS-J-3)

Comment: Millstone also contributes to the state's economy through direct job creation and spending on goods and services as well as the indirect multiplier effects.
(MS-J-4)

Comment: I cannot emphasize enough the economic importance of importance of Millstone for the town and region. Millstone provides good paying jobs and spends money at local businesses. It pays a very large portion of Waterford's taxes and contributes voluntarily to many community activities and charities. Personal spending by Millstone employees contributes greatly to the economic base of Southeastern Connecticut. In short, Millstone is one of the economic engines that keep our local economy on an upward track.
(MS-K-2)

Comment: The Millstone Nuclear Power Station, worth one percent of the workforce in Southeastern Connecticut, contributes a half a billion dollars to that $10 billion gross domestic product.... Roughly 1,500 employees are onsite. As has been indicated earlier, to use a conservative multiple, that leads to around 2,500 direct and indirect jobs in Southeastern Connecticut. Roughly two percent of our workforce is in one way, shape, or fashion connected to the Millstone Nuclear Power Station. The pay salaries at the nuclear power station are roughly 50 percent above the average in New London. As far as its expenditure within the region, as far as compensation of employees, it's around $75 million. If you add to that other parts of the state, you are roughly around $100 million annually. Direct and indirect compensation, if you want to play the multiple game, you are now talking about probably $150 million to $200 million. Millstone Point makes substantial purchases in New London County. In 2001, it bought a quarter of a billion dollars worth of goods and services in Southeastern Connecticut. It pays taxes. It pays a lot of taxes, $17 million in state and local taxes. Again, if you look at the indirect and direct effects, you are talking about roughly $60 million in state and local taxes as paid for by the nuclear power station.
(MS-M-2)

Comment: Of significance also to the economy of Southeastern Connecticut is the availability of safe and reliable electricity.
(MS-M-3)

Comment: And so the availability of safe and reliable nuclear power in Southeastern Connecticut gives us a cost-competitive advantage versus other parts of the state and other parts of the country in maintaining our economy. We support the relicensing of the Millstone Station.
(MS-M-4)

Comment: Suffice it to say that Millstone produces the equivalent of approximately 48 percent of the electricity that's used in Connecticut on a daily basis.
(MS-O-1)

Comment: I'm wondering if I understand correctly that there will be no major upgrades to the power plant that constitutes "refurbishment." Does this mean that major refurbishments are ongoing or will occur prior to 2015? Do improvements made before relicensing approval require the same level of scrutiny as refurbishments anticipated during the extended license period?
(MS-Q-3)

Comment: Page E-4-29 indicates that Dominion Nuclear Connecticut does not anticipate any related tax increase driven changes to off-site land use and development patterns. Well, I am here to say is that the impact of Millstone Point Station on tax revenue, infrastructure installation, and the overall level of service in Waterford is different than any other community in the State of Connecticut.
(MS-Q-8)

Comment: Now, on the down side, deregulation has suddenly removed two-thirds of the value of Millstone Point Station. We are left struggling to adjust and maintain a stable community.
(MS-Q-9)

Comment: Dominion is a key contributor to the regional and state economy directly employing more than 1,300 persons at the Millstone Station and annually purchasing more than $68 million in goods and services state-wide.
(MS-S-1)

Comment: I can't see how the taxes can go down on Millstone two and three. Unit 1, I can see where they went down because it's no longer in operation. But the value of the plants should be top-notched.
(MS-W-5)

Comment: Early today, Don Klepper-Smith, the economist, a very noted economist in the State of Connecticut, was the principal conducting that study and the figure that the overall impact that Millstone has on the economy of the region is $500 million. That's a major, major impact. That's includes goods and services purchased as well as personnel.
(MS-AA-2)

Comment: When restructuring occurred, our state legislature through the help of Melodie Peters and Andrea Stillman were very, very generous to the town of Waterford. In fact, they provided a ten year soft landing to the town. I stand corrected, but my memory, I believe, if it serves me correct, the ten years started with the sale of the plant. We got the equivalent the first year of the old assessment, the difference between the old assessment and the new assessment on the tenth year. The ninth year, it went down to 90 percent of that amount. Eighty percent. Seventy percent and it goes out for ten years.
(MS-AA-3)

Response: *The comments are related to the socioeconomic impacts on public services provided by public utilities and on offsite land use. These socioeconomic issues are specific to Millstone, and they will be addressed as Category 2 issues in Chapters 2 and 4 of the SEIS.*

5. Land Use

Comment: Sixth, issues of current land use of the property include a fill pile on Gardener's Wood Road. This pile was determined to contain materials of concern. What will occur with this pile if relicensing is approved?
(MS-Q-11)

Response: *The comment is related to land use. Land use issues are specific to Millstone, and they will be addressed as Category 2 issues in Chapters 2 and 4 of the SEIS.*

6. Human Health

Comment: My first comment has to be directed to the application materials and the assessment that appears to have been undertaken so far by the NRC. It seems to suffer from a major omission. That is, consideration of the biological effects of the ongoing operations of Millstone on the human population. Without even getting into the other aspects of the environment, we know that there has been a very significant effect on the human population in this community over the 34 years that the Millstone Reactors have been in operation. We have heard the business contributions ballyhoo here, but has anybody yet tallied up the enhancements to the health care professions in this industry going to the incidences of devastation and disease, despair brought about to individuals and families through cancer and other illnesses directly

attributable, we know, to the routine emissions from Millstone to the air and the water? We know that certain facilities such as the Community Cancer Center are doing well as businesses because of their patient load.
(MS-I-1)

Comment: We know that for our own organization, the Connecticut Coalition Against Millstone, we have suffered devastating losses just in the past year. We do not see any analysis in the present materials that have been submitted as to the deaths and illnesses of workers at Millstone. We have in mind particularly at the moment our wonderful stalwart, a friend and supporter, Joe Besade, who passed away this year. He had a devestating kind of cancer, suffered horribly, and there is every good reason to believe or every bad reason to believe that he suffered his illness and died because of what he was exposed to when he worked at the Millstone Nuclear Power Station. We don't see that you people have tracked any of the workers at Millstone since 1970 to the present time. What has happened to them? Where are they? Why have so many died prematurely? Why have so many suffered health effects? That's workers.
(MS-I-2)

Comment: Where is the information in this application and the NRC analysis of the human population and the areas around the communities immediately in the shadow of Millstone and even beyond? We know that there are cancer clusters. These have been identified to either side of Millstone and the beautiful areas. Take Millstone out of the picture and go to Jordan Cove and Niantic Bay, and these are some of the prettiest, most seemingly pristine areas of Southeastern Connecticut. They have identified cancer clusters. Go door to door. People have died. People are dying. There is a cancer wave, a cancer epidemic in this community that needs to be analyzed here during this process to determine the effects on the human population from the operations-to-date of Millstone. When the facts come in, there will be no question whatsoever that this plant, this facility must close because of its effect on the human population.
(MS-I-3)

Comment: ... in 1997, the Nuclear Energy Advisory Council commissioned a study looking to the incidence of cancer. It was initiated first because of our other plant down in Haddam. But the data was basically good for Millstone as well because Connecticut is such a small state. The scientists in the State of Connecticut indicated they could see no correlation between the operation of the nuclear plant in Waterford with the incidence of cancer in the State of Connecticut.
(MS-P-1)

Comment: The health of the public has not been considered or I'm not sure if it has at this point, but it must be taken into account. As a mother and a citizen, I know all too often the

heartbreaking stories of folks who have died and been stricken with cancers and leukemia. People are dying here and they have illnesses that should not be here. I believe it is caused by radiation.
(MS-V-4)

Comment: I have some information about some of the discharges that come from nuclear power plants. As far as the air, the routine releases, there is no filtering technology that exists for some gases like xenon 135 which decays into cesium 135, an isotope which multiplies, an isotope with a three million year half life. Also routine releases occur into the ocean. Radioactive corrosion products stick to the interior surfaces of the reactor vessels. Some call that radioactive crud. Fission products also enter the cooling water from leaks into the fuel rods. I'm sorry. I'm confused. I'll skip on. There's a maze of more than 50 miles of piping through which cooling water circulates. Leaks are bound to occur. In fact, the Nuclear Regulatory Commission allows leaks of up to 10 gallons a minute and this is a question I have. As nuclear plants age, the leaks generally increase. Also with a nuclear power plant, some of the discharge goes into the water and that, as well, cannot all be filtered. Tritium, for example, cannot be filtered. Tritiated water, a major byproduct of nuclear power plants, can be incorporated into the cells of the body. Some of the hazards resulting from tritium uptake include mutations, tumors and cell death. Dr. John Gofman, in his most recent report on low dose radiation, says that there is no such thing as a safe dose of radiation and that a low dose received slowly causes as many cancers as the same dose delivered all at once.
(MS-V-5)

Comment: ... while we cannot lower the level of natural radiation, it is my opinion that no one has the right to add manmade radiation on top of it. Any exposure to radiation increases the risk of genetic mutations, cancers and other life-shortening diseases.
(MS-V-6)

Comment: This is a document, "Millstone Power Station" - Dominion took the Nuclear out of its name - "2001 Radioactive Effluent Release Report." You can't see it from where you are, but I have extra copies I'm going to pass out. It shows all the different ways the radioactivity released into the air and into our waters makes its way through the environment, into our food supply, into our bodies and the bodies of other living things.
(MS-X-2)

Comment: Unfortunately, there's all too many stories, but those stories, I would argue, are backed up by a preponderance of evidence indicating that the radioactive releases from Millstone have caused all too many of these diseases and all too many of those kinds of deaths.
(MS-X-3)

Comment: Exhibit A is a report entitled "Elevated Childhood Cancer Incidents Proximate to U.S. Nuclear Power Plants." It's authored by Joseph Mangano and Janet Sherman of the Radiation and Public Health Project in New York City. It appeared in the Archives of Environmental Health in February of 2003. I'll read the abstract brief as follows: "Numerous reports document elevated cancer rates among children living near nuclear facilities in various nations. Little researching has examined U.S. rates near the nations 103 operating reactors. This study determined that cancer instance for children under 10 years of age who live within 30 miles of each of 14 nuclear plants in the Eastern United States exceeds the national average. The excess 12.4 percent risk suggests that one in nine cancers among children who reside near nuclear reactors is linked to radioactive emissions. Instance is particularly elevated for leukemia. Childhood cancer mortality exceeds the national average in seven of the 14 study areas." Of those 14 nuclear plants in the Eastern United States, one of those was Millstone. (MS-X-4)

Comment: Exhibit B is an excerpt from this document, "Cancer Incidence in Connecticut Counties 1995 by 1999." This is a publication of the Connecticut Tumor Registry. The Connecticut Tumor Registry is the oldest tumor registry in the United States that's been collecting this information since 1935. And keep in mind that our communities have suffered nearly 35 years of nuclear contamination from Millstone since Unit 1 started up in 1970. Looking at the — And also Millstone's radioactive releases are among the highest, if not the highest, of U.S. nuclear power plants. Particularly in the 1970's, the mid '70s, Unit 1 was operating with damaged fuel rods which exacerbated that problem. So we have a cumulative dose to our communities of nearly 35 years now. Looking at the records in more recent years since restart, I've seen that these releases are still continuing. Fortunately, they're not as excessive as they were back in the '70s, but they are still continuing. If you look at the record, the documents closely, you see that for what are called the liquid releases into Long Island Sound and Niantic Bay, each year there are hundreds of what are called batch releases. There are more releases. If you look at the documents closely, you see that there are identified in Unit 2 and Unit 3 continuous release points. If you look at the total amount of radioactivity that's documented, most of it comes from this continuous release points. So our communities are pretty much on daily basis being subjected to these releases.
(MS-X-5)

Comment: Going back to the Connecticut Tumor Registry Report '95 to '99, it reports the incidence of cancers. That is how many people get cancer as differentiated from the mortality, those who contract it who die because fortunately, not everyone who gets it dies. It reports the incidence rate per 100,000 population adjusted for age. ... So for those years in New London County, it's broken down by gender also. For females, New London County was number one among the eight states. Males, we're number two, just barely a little bit lower than Tolland County. There's an early report, 1995 to 1998, in which New London County was number one for both male and female. ... So New London County for the years we're talking about was

number one for the following cancers: esophagus for males, colon and rectum for females, colon for females, rectum for females, liver for males, breasts for females, cervix for females, uterus for females, other female genital, females of course, bladder, males, bladder, females, multi-myeloma for females in a tie with Fairfield County. ... Suffice it to say, that the total kind of cancers in which New London County was counted as a separate county because for some of these, it was lumped in with other counties, was a total of 39. Okay. New London County had 12 No. 1s, six No. 2s, five No. 3s and seven No. 4s for a total of 30 out of 39. Not a very good record.
(MS-X-6)

Comment: Document No. 3 is called "The Radiation Exposure Compensation Act." In 1990, Congress passed this act saying that people that were downwind of atmospheric nuclear tests in the '50s and '60s in parts of Utah and Nevada and Arizona and also people who worked in uranium mines should be compensated for the damages that they suffered because of those tests that were done in name of national security. It names specific diseases for the downwinders. Those were specified diseases. They're called lymphocytic leukemia, multiple myeloma, lymphomas other than Hodgkin's Disease and primary cancer of the thyroid, breast, esophagus, stomach, pharynx, small intestine, pancreas, bile ducts, gall bladder or liver except cirrhosis or hepatis B. The reason why I'm bringing this up is because if you look at the breakdown of the specific kinds of cancers in New London County, '95 to '98, pretty much all of those that were named in this 1990 Act of Congress show upon this list. They are caused by ionizing radiation, the kind of radiation that's released from Millstone every day and has been for almost 35 years now.
(MS-X-7)

Comment: The final document I'm going to bring up is a summary of a document by Joseph Mangano, who is one of the authors of the first document I've talked about. This was from 1998 and the title of it is "2,500 Excess Cancer Cases in New London County Since 1970: Radioactive Emissions from Millstone May Be The Cause." "About 2500 excess cancers have occurred in New London County since the first Millstone Nuclear Power reactor in Waterford opened in 1970. About 800 of these cases resulted in death, using official figures published by the National Cancer Institute and the Connecticut Tumor Registry.". ... "In the '50s and '60s," I'm quoting from the document now, "New London County cancer incidence rate was eight percent below the state average, rising to two percent below from '71 to '84 and 2.5 percent above in '89 to '91." So that goes from eight percent below the state average to 2.5 percent above. "In Millstone's first 14 years, the county cancer mortality rate was 11 percent above the nation compared to five percent above in the '50s and '60s according the National Cancer Institute. An approximate total 800 additional cancer deaths occurred in the county since Millstone opened."
(MS-X-8)

Comment: Then Mangano also looks at specific kinds of cancers. For children, leukemia in Millstone's first 14 years, leukemia cases for New London County for children under 10 was 55 percent higher than the state and leukemia deaths 45 percent higher. Again, his source is the National Cancer Institute.
(MS-X-9)

Comment: For thyroid cancer — And I should mention that in those worst years of 1970s when Millstone was operating with damaged fuel rods, it was releasing dangerous amounts of radioactive iodine into the air and into the water. So the rate of thyroid cancer in New London County has risen twice as fast as the rest of Connecticut after 1970. Before understanding that, thyroid cancer is normally, if there is such a thing as normal any more, a very rare disease and it predominantly strikes females. For Millstone, about three cases per year were diagnosed in the county. By the early 1990, the number jumped to 17. That's according to Connecticut Tumor Registry.
(MS-X-10)

Comment: And he also looked at the four towns nearest the reactor, being East Lyme, Groton, Waterford and New London. Females cancers in '89 to '91, cancer cases in these four towns were 15 percent higher than the state tumor registry. Female only cancers were especially high in breast cancer, 20 percent greater than the state. Cervical cancer, 26 percent greater. Ovarian cancer, 35 percent greater and uterine cancer, 29 percent greater.
(MS-X-11)

Comment: For skin cancer - this is the last thing I'm going to say - malignant myeloma incidence in the four towns in '89 to '90 was 65 percent greater than for the rest of Connecticut. Connecticut Tumor Registry. You might say, "Well we live at the shore. We go to the beach all the time. So that's why." But Mangano took the trouble to look at the rest of the Connecticut coastal towns and found that, yes, their rate was higher than the state also, but it was only seven percent higher compared to ours which was 65 percent higher.
(MS-X-12)

Comment: In the transcript of the May 18 public meeting re Millstone, on page 104, line 6, it reads: Mr. Steinberg (inaudible) What I actually said was: "Except Millstone. The study found a problem around Millstone with childhood leukemia." This was in reference to the NCI 1990 study of US nuclear power plants that Mr. Emch was discussing. I was referring to this passage from the study's conclusions: "On examination of the data for individual facilities, only the incidence data for the area around Millstone nuclear power plant ... showed a significantly increased relative risk of leukemia ages 0-9." I am requesting that the above be entered into the public record. Thank you.
(MS-X-13)

Comment: I'm going to read you some excerpts from the Nuclear Energy Advisory Council's Report to the Governor and the State Legislature of 2001, "Cancer Risk Study."... "As a result of its findings, the CASE committee concluded that atmospheric emissions from Connecticut Yankee have not had a detectable influence on cancer incident. The committee also concluded that an additional study of this topic is unlikely to produce any positive correlation." ... The committee then performed an analysis to compare the calculated doses with the Connecticut Tumor Registry data. Results of logistic regression analysis comparing these incidents, population counts and estimated exposure levels did not identify meaningful associations among the cancers and the radiation exposures in the towns. In comparison for some tumors, a negative correlation was found. Conclusions. The committee found that exposure to radionuclides emitted from Connecticut Yankee are so low as to be negligible. The committee also found no meaningful associations among the cancers studied, pediatric leukemia, adult chronic leukemia, multiple myeloma and thyroid cancer and the proximity of the Connecticut Yankee. ... I go back to the NEAC report now. "NEAC initiated this study in request and in response to public concern raised at this meeting. NEAC expressed its sincere appreciation to CASE and its leadership for this important study which clearly demonstrated that nuclear plant emissions had not had a detectable influence on cancer incidence in the State of Connecticut. As the CASE report used data from the Connecticut Tumor Registry, a like study of Millstone emissions would provide a similar result."
(MS-Z-1)

Comment: In considering the causes of these cancers, the radioactive releases from Millstone must be included, as the reactors have the highest contribution to manmade radioactive pollution in the county.
(MS-AK-1)

Comment: I also encourage you and the NRC staff to investigate the high incidences of ionizing radiation-related cancers and other related diseases in the Millstone vicinity. You are well advised to consult *Millstone and Me* by Michael Steinberg as an introductory source.
(MS-AL-4)

Response: *The comments are related to human health issues. Human health issues were evaluated in the GEIS and were determined to be Category 1 issues. However, the comments provided a large amount of information and health statistics related to the area around Millstone, which are being evaluated by the NRC staff to determine if they constitute significant, new information. Human health issues will be addressed Chapter 4 of the SEIS.*

7. Uranium Fuel Cycle and Waste Management

Comment: Nuclear energy is very, very dirty. That's why nobody wants to keep nuclear waste in their backyard. That's why everybody is talking about shipping it out somewhere far, far away. It's probably the dirtiest form of production of energy that can be fathomed. Even in the process of uranium enrichment, there are all kinds of ways in which the air is polluted through generation of fossil power.
(MS-I-7)

Comment: Nuclear plants are anything but clean and to say they don't burn fossil fuel, well that really burns me up too. Fossil fuel is used in mining the uranium, processing the uranium into the fuel. Onsite for construction, there's a lot of fossil fuel used. The energy to operate, perhaps they use their own electricity and at some point, we'll be transporting this waste to a final resting place and that will take a good amount of fossil fuel there.
(MS-V-2)

Comment: It would seem to me that it's something that could be done in a matter of days, not weeks, if the bureaucracy wanted to get going to figure out whether dry casks are safer than the water pools. It's not secret that the spent-fuel pools are the weak link in the safety of the plants from a terrorist attack standpoint. It would seem to me a no-brainer that dry casks harden, dry cask bunkers are safer and that it could quickly be determined and that everybody whether you're pro or anti-nuclear, whether you're industry or regulatory, we could all agree that this is the cardinal safety issue that needs to be addressed and could be addressed in a matter of months, I would think.
(MS-Y-2)

Response: *The comments are related to the uranium fuel cycle and waste management issues. Uranium fuel cycle and waste management issues were evaluated in the GEIS and were determined to be Category 1 issues. The comments provide no new and significant information on these fuel cycle and waste issues; therefore, the comments will not be evaluated further.*

8. Postulated Accidents

Comment: I'm looking at Table F.3-2 submitted January 2004 on page E-F-80. This is one page of many that list a number of potential improvements that the company itself believes could enhance safety and operations at Millstone. Let me read one to you. "187, potential improvement, automate start capability of Terry turbine. Discussion, operator fails to start the

Terry turbine." Then there's an analysis of what it would cost to make this potential improvement. There is a conclusion that it is not worth the cost. It is not cost beneficial since the cost is greater than twice the benefit. That doesn't sound to me like the company has decided always to go for safety over cost.
(MS-I-8)

Response: *The comment is related to the severe accident mitigation alternatives analysis. This analysis will be discussed in Chapter 5 and Appendix G of the SEIS.*

9. Alternatives

Comment: While the town is continuously concerned about the plant's impacts on the fisheries of Long Island Sound, the installation of cooling towers on this site has broad aesthetic as well as land use implications.
(MS-Q-5)

Comment: I would like to conclude by saying it's time to consider phasing out these plants and move ahead with combinations of conservation and alternative energies such as gas, wind and solar technologies which are moving forward.
(MS-V-7)

Comment: ... the biggest problem is there are alternative methods out there and we do not need an energy to produce electricity.
(MS-W-1)

Comment: They've had co-generation plants start up that's helped produced just as much power as Unit 3 and there's more and more.
(MS-W-2)

Comment: We can diversify our energy. We can't depend on nuclear. We can't depend on oil.
(MS-W-8)

Response: *The comments are related to the environmental impacts of alternatives to license renewal at Millstone. The GEIS included an extensive discussion of alternative energy sources. Environmental impacts associated with various reasonable alternatives to renewal of the operating licenses for Millstone will be evaluated in Chapter 8 of the SEIS.*

Part II - Comments Received on the Draft SEIS

Pursuant to 10 CFR Part 51, the staff transmitted the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Regarding Millstone Power Station Units 2 and 3, Draft Report for Comment* (NUREG-1437, Supplement 22, referred to as the draft SEIS) to Federal, State, and local government agencies as well as interested members of the public, requesting comments by March 2, 2005. As part of the process to solicit public comments on the draft SEIS, the staff:

- placed a copy of the draft SEIS into the NRC's electronic Public Document Room, its license renewal website, and the Waterford Public Library, 49 Rope Ferry Road, Waterford, Connecticut, and the Three Rivers Community College, Thames River Campus Library, 574 New London Turnpike, Norwich, Connecticut
- sent copies of the draft SEIS to the applicant, members of the public who requested copies, and certain Federal, State, and local agencies
- published a notice of availability of the draft SEIS and opportunity for comment in the *Federal Register* on December 9, 2004 (69 FR 71437)
- issued public announcements, such as advertisements in local newspapers and postings in public places, of the availability of the draft SEIS
- announced and held two public meetings in Waterford, Connecticut on January 11, 2005, to describe the results of the environmental review and answer related questions
- issued public service announcements and press releases announcing the issuance of the draft SEIS, the public meetings, and instructions on how to comment on the draft SEIS
- established a website to receive comments on the draft SEIS through the Internet.

During the comment period, the staff received a total of 59 sets of comments in the forms of letters, emails, and public meeting feedback forms.

The staff has reviewed the public meeting transcripts and the written comments that are part of the docket file for the application, all of which are available in the NRC's Electronic Public Document Room. Appendix A, Part II, Section A.4 contains a summary of the comments and the staff's responses. Related issues are grouped together. Appendix A, Part II, Section A.5 contains excerpts of the January 11, 2005, public meeting transcripts, the written statements provided at the public meetings, and the written comments.

Each comment identified by the staff was assigned a specific alpha-numeric identifier (marker). That identifier is typed in the margin of the transcript or letter at the beginning of the discussion of the comment. A cross-reference of the alpha-numeric identifiers, the speaker or author of the comment, the page where the comment can be found, and the section(s) of this report in which the comment is addressed are provided in Table A-2. The speakers at the meetings are listed in speaking order along with the page of the transcript excerpts in this report on which the comment appears. These comments are identified by the letters "MPS" followed by a number that identifies each comment in approximate chronological order in which the comments were made. The written statements (from the public meetings) and written comment letters are also identified by the letters "MPS."

The staff made a determination on each comment that it was one of the following:

(1) a comment that was actually a request for information and introduced no new information

(2) a comment that was either related to support or opposition of license renewal in general (or specifically Millstone Power Station, Units 2 and 3) or that made a general statement about the license renewal process. It may have made only a general statement regarding Category 1 and/or Category 2 issues. In addition, it provided no new information and does not pertain to safety considerations reviewed under 10 CFR Part 54

(3) a comment about a Category 1 issue that
- (a) provided significant new information that required evaluation during the review, or
- (b) provided no significant new information

(4) a comment about a Category 2 issue that
- (a) provided significant information that required evaluation during the review, or
- (b) provided no such information

(5) a comment that raised an environmental issue that was not addressed in the GEIS or the draft SEIS

(6) a comment on safety issues pertaining to 10 CFR Part 54

(7) a comment outside the scope of license renewal (not related to 10 CFR Parts 51 or 54), or

(8) a comment that was editorial in nature.

Comment types 3, 4, 5, and 8 may have resulted in changes to the text.

There was no significant new information provided on Category 1 issues [(3)(a) above] or

information that required further evaluation on Category 2 issues [(4)(a)]. Therefore, the GEIS and draft SEIS remained valid and bounding, and no further evaluation was performed. Comments without a supporting technical basis or without any new information are discussed in this appendix, and not in other sections of this report. Relevant references that address the issues within the regulatory authority of the NRC are provided where appropriate. Many of these references can be obtained from the NRC Electronic Public Document Room.

Within each section of Part II of this appendix (A.4.1 through A.4.16), similar comments are grouped together for ease of reference, and a summary description of the comments is given, followed by the staff's response. Where the comment or question resulted in a change in the text of the draft report, the corresponding response refers the reader to the appropriate section of this report where the change was made. Revisions to the text in the draft report are designated by vertical lines beside the text.

Some numbers were initially assigned to portions of verbal or written statements that were later determined not to be comments. These items were removed from the table. As a result, not all numbers are sequential (see Table A-2.)

Table A.2 Comments Received on the Draft SEIS

Comment ID	Commenter	Source	Comment Location	Section(s) Where Addressed
MPS-1-1	G. Merrill	Afternoon Transcript (01/11/05)	A-121	A.2.9
MPS-1-2	G. Merrill	Afternoon Transcript (01/11/05)	A-114	A.2.9
MPS-1-3	G. Merrill	Afternoon Transcript (01/11/05)	A-85	A.2.9
MPS-1-4	G. Merrill	Afternoon Transcript (01/11/05)	A-115	A.2.9
MPS-1-5	G. Merrill	Afternoon Transcript (01/11/05)	A-115	A.2.9
MPS-1-6	G. Merrill	Afternoon Transcript (01/11/05)	A-103	A.2.9
MPS-2-1	N. Burton	Afternoon Transcript (01/11/05)	A-86	A.2.9
MPS-2-2	N. Burton	Afternoon Transcript (01/11/05)	A-85	A.2.9
MPS-2-3	N. Burton	Afternoon Transcript (01/11/05)	A-103	A.2.9
MPS-2-4	N. Burton	Afternoon Transcript (01/11/05)	A-113	A.2.9
MPS-2-5	N. Burton	Afternoon Transcript (01/11/05)	A-86	A.2.9
MPS-2-6	N. Burton	Afternoon Transcript (01/11/05)	A-85	A.2.9
MPS-2-7	N. Burton	Afternoon Transcript (01/11/05)	A-86	A.2.9
MPS-2-8	N. Burton	Afternoon Transcript (01/11/05)	A-100	A.2.9
MPS-2-9	N. Burton	Afternoon Transcript (01/11/05)	A-50	A.2.4
MPS-2-10	N. Burton	Afternoon Transcript (01/11/05)	A-38	A.2.1
MPS-3-1	M. Steinberg	Afternoon Transcript (01/11/05)	A-86	A.2.9
MPS-3-2	M. Steinberg	Afternoon Transcript (01/11/05)	A-86	A.2.9
MPS-3-3	M. Steinberg	Afternoon Transcript (01/11/05)	A-87	A.2.9
MPS-3-4	M. Steinberg	Afternoon Transcript (01/11/05)	A-87	A.2.9

Comment ID	Commenter	Source	Comment Location	Section(s) Where Addressed
MPS-3-5	M. Steinberg	Afternoon Transcript (01/11/05)	A-104	A.2.9
MPS-3-6	M. Steinberg	Afternoon Transcript (01/11/05)	A-87	A.2.9
MPS-3-7	M. Steinberg	Afternoon Transcript (01/11/05)	A-87	A.2.9
MPS-3-8	M. Steinberg	Afternoon Transcript (01/11/05)	A-87	A.2.9
MPS-3-9	M. Steinberg	Afternoon Transcript (01/11/05)	A-88	A.2.9
MPS-3-10	M. Steinberg	Afternoon Transcript (01/11/05)	A-88	A.2.9
MPS-3-11	M. Steinberg	Afternoon Transcript (01/11/05)	A-119	A.2.9
MPS-3-12	M. Steinberg	Afternoon Transcript (01/11/05)	A-143	A.2.13
MPS-3-13	M. Steinberg	Afternoon Transcript (01/11/05)	A-47	A.2.3
MPS-3-14	M. Steinberg	Afternoon Transcript (01/11/05)	A-88	A.2.9
MPS-3-15	M. Steinberg	Afternoon Transcript (01/11/05)	A-88	A.2.9
MPS-4-1	P. Bowman	Afternoon Transcript (01/11/05)	A-122	A.2.10
MPS-4-2	P. Bowman	Afternoon Transcript (01/11/05)	A-47	A.2.3
MPS-4-3	P. Bowman	Afternoon Transcript (01/11/05)	A-113	A.2.9
MPS-4-4	P. Bowman	Afternoon Transcript (01/11/05)	A-129	A.2.12
MPS-4-5	P. Bowman	Afternoon Transcript (01/11/05)	A-131	A.2.13
MPS-5-1	M. Bowman	Afternoon Transcript (01/11/05)	A-114	A.2.9
MPS-5-2	M. Bowman	Afternoon Transcript (01/11/05)	A-110	A.2.9
MPS-5-3	M. Bowman	Afternoon Transcript (01/11/05)	A-82	A.2.8
MPS-5-4	M. Bowman	Afternoon Transcript (01/11/05)	A-124	A.2.11
MPS-5-5	M. Bowman	Afternoon Transcript (01/11/05)	A-132	A.2.13
MPS-6-1	C. Besade	Afternoon Transcript (01/11/05)	A-129	A.2.12
MPS-6-2	C. Besade	Afternoon Transcript (01/11/05)	A-129	A.2.12
MPS-6-3	C. Besade	Afternoon Transcript (01/11/05)	A-129	A.2.12
MPS-6-4	C. Besade	Afternoon Transcript (01/11/05)	A-141	A.2.13
MPS-6-5	C. Besade	Afternoon Transcript (01/11/05)	A-111	A.2.9
MPS-6-6	C. Besade	Afternoon Transcript (01/11/05)	A-111	A.2.9
MPS-6-7	C. Besade	Afternoon Transcript (01/11/05)	A-89	A.2.9
MPS-6-8	C. Besade	Afternoon Transcript (01/11/05)	A-89	A.2.9
MPS-7-1	S. Scace	Afternoon Transcript (01/11/05)	A-143	A.2.13
MPS-8-1	J. Horton	Afternoon Transcript (01/11/05)	A-56	A.2.5
MPS-8-2	J. Horton	Afternoon Transcript (01/11/05)	A-38	A.2.1
MPS-8-3	J. Horton	Afternoon Transcript (01/11/05)	A-39	A.2.1
MPS-8-4	J. Horton	Afternoon Transcript (01/11/05)	A-132	A.2.13
MPS-8-5	J. Horton	Afternoon Transcript (01/11/05)	A-132	A.2.13
MPS-8-6	J. Horton	Afternoon Transcript (01/11/05)	A-39	A.2.1
MPS-8-7	J. Horton	Afternoon Transcript (01/11/05)	A-39	A.2.1
MPS-8-8	J. Horton	Afternoon Transcript (01/11/05)	A-39	A.2.1
MPS-9-1	M. Domino	Afternoon Transcript (01/11/05)	A-122	A.2.10
MPS-9-2	M. Domino	Afternoon Transcript (01/11/05)	A-132	A.2.13

Comment ID	Commenter	Source	Comment Location	Section(s) Where Addressed
MPS-9-3	M. Domino	Afternoon Transcript (01/11/05)	A-132	A.2.13
MPS-9-4	M. Domino	Afternoon Transcript (01/11/05)	A-122	A.2.10
MPS-9-5	M. Domino	Afternoon Transcript (01/11/05)	A-40	A.2.1
MPS-9-6	M. Domino	Afternoon Transcript (01/11/05)	A-47	A.2.3
MPS-10-1	M. Domenici	Afternoon Transcript (01/11/05)	A-40	A.2.1
MPS-10-2	M. Domenici	Afternoon Transcript (01/11/05)	A-133	A.2.13
MPS-10-3	M. Domenici	Afternoon Transcript (01/11/05)	A-89	A.2.9
MPS-10-4	M. Domenici	Afternoon Transcript (01/11/05)	A-138	A.2.13
MPS-10-5	M. Domenici	Afternoon Transcript (01/11/05)	A-138	A.2.13
MPS-10-6	M. Domenici	Afternoon Transcript (01/11/05)	A-122	A.2.10
MPS-10-7	M. Domenici	Afternoon Transcript (01/11/05)	A-47	A.2.3
MPS-11-1	C.Willauer	Afternoon Transcript (01/11/05)	A-138	A.2.13
MPS-11-2	C.Willauer	Afternoon Transcript (01/11/05)	A-89	A.2.9
MPS-11-3	C.Willauer	Afternoon Transcript (01/11/05)	A-130	A.2.9
MPS-11-4	C.Willauer	Afternoon Transcript (01/11/05)	A-125	A.2.11
MPS-11-5	C.Willauer	Afternoon Transcript (01/11/05)	A-138	A.2.13
MPS-11-6	C.Willauer	Afternoon Transcript (01/11/05)	A-47	A.2.3
MPS-11-7	C.Willauer	Afternoon Transcript (01/11/05)	A-125	A.2.11
MPS-11-8	C.Willauer	Afternoon Transcript (01/11/05)	A-82	A.2.8
MPS-11-9	C.Willauer	Afternoon Transcript (01/11/05)	A-121	A.2.9
MPS-11-10	C.Willauer	Afternoon Transcript (01/11/05)	A-125	A.2.11
MPS-12-1	T. Sheridan	Afternoon Transcript (01/11/05)	A-143	A.2.13
MPS-12-2	T. Sheridan	Afternoon Transcript (01/11/05)	A-40	A.2.1
MPS-12-3	T. Sheridan	Afternoon Transcript (01/11/05)	A-141	A.2.13
MPS-13-1	J. Markowicz	Afternoon Transcript (01/11/05)	A-46	A.2.2
MPS-13-2	J. Markowicz	Afternoon Transcript (01/11/05)	A-46	A.2.2
MPS-13-3	J. Markowicz	Afternoon Transcript (01/11/05)	A-133	A.2.13
MPS-14-1	M. Peters	Afternoon Transcript (01/11/05)	A-46	A.2.2
MPS-14-2	M. Peters	Afternoon Transcript (01/11/05)	A-141	A.2.13
MPS-14-3	M. Peters	Afternoon Transcript (01/11/05)	A-125	A.2.11
MPS-15-1	G. Merrill	Evening Transcript (01/11/05)	A-89	A.2.9
MPS-16-1	C. Besade	Evening Transcript (01/11/05)	A-90	A.2.9
MPS-16-2	C. Besade	Evening Transcript (01/11/05)	A-89	A.2.9
MPS-16-3	C. Besade	Evening Transcript (01/11/05)	A-90	A.2.9
MPS-16-4	C. Besade	Evening Transcript (01/11/05)	A-90	A.2.9
MPS-16-5	C. Besade	Evening Transcript (01/11/05)	A-90	A.2.9
MPS-17-1	S. Herbert	Evening Transcript (01/11/05)	A-90	A.2.9
MPS-18-1	G. Winslow	Evening Transcript (01/11/05)	A-90	A.2.9
MPS-18-2	G. Winslow	Evening Transcript (01/11/05)	A-130	A.2.12
MPS-18-3	G. Winslow	Evening Transcript (01/11/05)	A-130	A.2.12
MPS-18-4	G. Winslow	Evening Transcript (01/11/05)	A-130	A.2.12

Comment ID	Commenter	Source	Comment Location	Section(s) Where Addressed
MPS-18-5	G. Winslow	Evening Transcript (01/11/05)	A-90	A.2.9
MPS-18-6	G. Winslow	Evening Transcript (01/11/05)	A-44	A.2.1
MPS-18-7	G. Winslow	Evening Transcript (01/11/05)	A-53	A.2.4
MPS-18-8	G. Winslow	Evening Transcript (01/11/05)	A-76	A.2.5
MPS-18-9	G. Winslow	Evening Transcript (01/11/05)	A-119	A.2.9
MPS-18-10	G. Winslow	Evening Transcript (01/11/05)	A-83	A.2.8
MPS-18-11	G. Winslow	Evening Transcript (01/11/05)	A-44	A.2.1
MPS-18-12	G. Winslow	Evening Transcript (01/11/05)	A-122	A.2.10
MPS-18-13	G. Winslow	Evening Transcript (01/11/05)	A-47	A.2.3
MPS-19-1	D. Schwartz	Evening Transcript (01/11/05)	A-138	A.2.13
MPS-19-2	D. Schwartz	Evening Transcript (01/11/05)	A-44	A.2.1
MPS-19-3	D. Schwartz	Evening Transcript (01/11/05)	A-139	A.2.13
MPS-19-4	D. Schwartz	Evening Transcript (01/11/05)	A-139	A.2.13
MPS-20-1	B. Ritter	Evening Transcript (01/11/05)	A-46	A.2.2
MPS-20-2	B. Ritter	Evening Transcript (01/11/05)	A-143	A.2.13
MPS-21-1	B. Vachris	Evening Transcript (01/11/05)	A-82	A.2.8
MPS-21-2	B. Vachris	Evening Transcript (01/11/05)	A-82	A.2.8
MPS-21-3	B. Vachris	Evening Transcript (01/11/05)	A-46	A.2.2
MPS-21-4	B. Vachris	Evening Transcript (01/11/05)	A-46	A.2.2
MPS-22-1	G. Merrill	Evening Transcript (01/11/05)	A-104	A.2.9
MPS-22-2	G. Merrill	Evening Transcript (01/11/05)	A-90	A.2.9
MPS-22-3	G. Merrill	Evening Transcript (01/11/05)	A-115	A.2.9
MPS-22-4	G. Merrill	Evening Transcript (01/11/05)	A-115	A.2.9
MPS-22-5	G. Merrill	Evening Transcript (01/11/05)	A-115	A.2.9
MPS-23-1	N. Burton	Evening Transcript (01/11/05)	A-40	A.2.1
MPS-23-2	N. Burton	Evening Transcript (01/11/05)	A-139	A.2.13
MPS-23-3	N. Burton	Evening Transcript (01/11/05)	A-91	A.2.9
MPS-23-4	N. Burton	Evening Transcript (01/11/05)	A-91	A.2.9
MPS-23-5	N. Burton	Evening Transcript (01/11/05)	A-104	A.2.9
MPS-23-6	N. Burton	Evening Transcript (01/11/05)	A-91	A.2.9
MPS-23-7	N. Burton	Evening Transcript (01/11/05)	A-104	A.2.9
MPS-23-8	N. Burton	Evening Transcript (01/11/05)	A-53	A.2.4
MPS-23-9	N. Burton	Evening Transcript (01/11/05)	A-70	A.2.5
MPS-23-10	N. Burton	Evening Transcript (01/11/05)	A-76	A.2.5
MPS-23-11	N. Burton	Evening Transcript (01/11/05)	A-77	A.2.5
MPS-23-12	N. Burton	Evening Transcript (01/11/05)	A-126	A.2.11
MPS-23-13	N. Burton	Evening Transcript (01/11/05)	A-40	A.2.1
MPS-24-1	J. Markowicz	Evening Transcript (01/11/05)	A-141	A.2.13
MPS-24-2	J. Markowicz	Evening Transcript (01/11/05)	A-139	A.2.13
MPS-24-3	J. Markowicz	Evening Transcript (01/11/05)	A-139	A.2.13

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MPS-24-4	J. Markowicz	Evening Transcript (01/11/05)	A-133	A.2.13
MPS-25-1	L. Natusch	Evening Transcript (01/11/05)	A-139	A.2.13
MPS-25-2	L. Natusch	Evening Transcript (01/11/05)	A-61	A.2.5
MPS-25-3	L. Natusch	Evening Transcript (01/11/05)	A-109	A.2.9
MPS-26-1	L. Suter	January 11, 2005, letter	A-47	A.2.3
MPS-26-2	L. Suter	January 11, 2005, letter	A-139	A.2.9
MPS-27-1	M. Hess	January 25, 2005 email	A-62	A.2.5
MPS-28-1	C. Pillsbury/A Brison	February 10, 2005 letter	A-48	A.2.3
MPS-28-2	C. Pillsbury/A Brison	February 10, 2005 letter	A-141	A.2.13
MPS-28-3	C. Pillsbury/A Brison	February 10, 2005 letter	A-133	A.2.13
MPS-28-4	C. Pillsbury/A Brison	February 10, 2005 letter	A-139	A.2.13
MPS-28-5	C. Pillsbury/A Brison	February 10, 2005 letter	A-83	A.2.8
MPS-28-6	C. Pillsbury/A Brison	February 10, 2005 letter	A-109	A.2.9
MPS-28-7	C. Pillsbury/A Brison	February 10, 2005 letter	A-144	A.2.13
MPS-28-8	C. Pillsbury/A Brison	February 10, 2005 letter	A-41	A.2.1
MPS-29-1	D. Simpson	January 5, 2005 email	A-79	A.2.5
MPS-29-2	D. Simpson	January 5, 2005 email	A-56	A.2.5
MPS-29-3	D. Simpson	January 5, 2005 email	A-56	A.2.5
MPS-29-4	D. Simpson	January 5, 2005 email	A-56	A.2.5
MPS-30-1	M. Domenici	January 6, 2005 email	A-48	A.2.3
MPS-30-2	M. Domenici	January 6, 2005 email	A-139	A.2.13
MPS-30-3	M. Domenici	January 6, 2005 email	A-110	A.2.9
MPS-30-4	M. Domenici	January 6, 2005 email	A-125	A.2.11
MPS-31-1	M. Baran	January 7, 2005 email	A-133	A.2.13
MPS-32-1	P. Acampora	January 10, 2005 email	A-133	A.2.13
MPS-33-1	W. J. Burgess	January 11, 2005 email	A-46	A.2.2
MPS-34-1	B. Doyle	January 11, 2005 email	A-48	A.2.3
MPS-34-2	B. Doyle	January 11, 2005 email	A-122	A.2.10
MPS-35-1	A. Farinacci	January 14, 2005 email	A-48	A.2.3
MPS-35-2	A. Farinacci	January 14, 2005 email	A-134	A.2.13
MPS-36-1	C. Case	January 14, 2005 email	A-134	A.2.13

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MPS-37-1	J. Circo-Randazzo	January 14, 2005 email	A-48	A.2.3
MPS-37-2	J. Circo-Randazzo	January 14, 2005 email	A-134	A.2.13
MPS-38-1	B. & V. DiPaola	January 17, 2005 email	A-41	A.2.1
MPS-38-2	B. & V. DiPaola	January 17, 2005 email	A-134	A.2.13
MPS-39-1	B. Garrett	January 17, 2005 email	A-48	A.2.3
MPS-40-1	V. Briody/ M. Swearingen	January 31, 2005 email	A-48	A.2.3
MPS-40-2	V. Briody/ M. Swearingen	January 31, 2005 email	A-134	A.2.13
MPS-41-1	Josephine	February 1, 2005 email	A-48	A.2.3
MPS-42-1	J. Magnesi	February 9, 2005 email	A-41	A.2.1
MPS-43-1	M. Domenici	February 23, 2005 email	A-41	A.2.1
MPS-44-1	M. Domino	January 11, 2005 Public Meeting Feedback Form	A-42	A.2.1
MPS-45-1	W. Parahas	January 11, 2005 Public Meeting Feedback Form	A-48	A.2.3
MPS-45-2	W. Parahas	January 11, 2005 Public Meeting Feedback Form	A-79	A.2.5
MPS-45-3	W. Parahas	January 11, 2005 Public Meeting Feedback Form	A-91	A.2.9
MPS-46-1	N. Burton	January 11, 2005 letter	A-104	A.2.9
MPS-46-2	N. Burton	January 11, 2005 letter	A-91	A.2.9
MPS-46-3	N. Burton	January 11, 2005 letter	A-105	A.2.9
MPS-46-4	N. Burton	January 11, 2005 letter	A-91	A.2.9
MPS-46-5	N. Burton	January 11, 2005 letter	A-119	A.2.9
MPS-46-6	N. Burton	January 11, 2005 letter	A-92	A.2.9
MPS-46-7	N. Burton	January 11, 2005 letter	A-144	A.2.13
MPS-47-1	E. Grecheck	February 25, 2005 letter	A-84	A.2.8
MPS-47-2	E. Grecheck	February 25, 2005 letter	A-54	A.2.4
MPS-47-3	E. Grecheck	February 25, 2005 letter	A-54	A.2.4
MPS-47-4	E. Grecheck	February 25, 2005 letter	A-123	A.2.10
MPS-47-5	E. Grecheck	February 25, 2005 letter	A-123	A.2.10
MPS-47-6	E. Grecheck	February 25, 2005 letter	A-123	A.2.10
MPS-47-7	E. Grecheck	February 25, 2005 letter	A-124	A.2.10
MPS-47-8	E. Grecheck	February 25, 2005 letter	A-84	A.2.8
MPS-47-9	E. Grecheck	February 25, 2005 letter	A-80	A.2.6
MPS-47-10	E. Grecheck	February 25, 2005 letter	A-54	A.2.4
MPS-47-11	E. Grecheck	February 25, 2005 letter	A-54	A.2.4

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MPS-47-12	E. Grecheck	February 25, 2005 letter	A-55	A.2.4
MPS-47-13	E. Grecheck	February 25, 2005 letter	A-55	A.2.4
MPS-47-14	E. Grecheck	February 25, 2005 letter	A-55	A.2.4
MPS-47-15	E. Grecheck	February 25, 2005 letter	A-81	A.2.7
MPS-47-16	E. Grecheck	February 25, 2005 letter	A-56	A.2.5
MPS-47-17	E. Grecheck	February 25, 2005 letter	A-56	A.2.5
MPS-47-18	E. Grecheck	February 25, 2005 letter	A-55	A.2.4
MPS-47-19	E. Grecheck	February 25, 2005 letter	A-57	A.2.5
MPS-47-20	E. Grecheck	February 25, 2005 letter	A-57	A.2.5
MPS-47-21	E. Grecheck	February 25, 2005 letter	A-57	A.2.5
MPS-47-22	E. Grecheck	February 25, 2005 letter	A-57	A.2.5
MPS-47-23	E. Grecheck	February 25, 2005 letter	A-58	A.2.5
MPS-47-24	E. Grecheck	February 25, 2005 letter	A-58	A.2.5
MPS-47-25	E. Grecheck	February 25, 2005 letter	A-58	A.2.5
MPS-47-26	E. Grecheck	February 25, 2005 letter	A-58	A.2.5
MPS-47-27	E. Grecheck	February 25, 2005 letter	A-58	A.2.5
MPS-47-28	E. Grecheck	February 25, 2005 letter	A-58	A.2.5
MPS-47-29	E. Grecheck	February 25, 2005 letter	A-80	A.2.6
MPS-47-30	E. Grecheck	February 25, 2005 letter	A-80	A.2.6
MPS-47-31	E. Grecheck	February 25, 2005 letter	A-80	A.2.6
MPS-47-32	E. Grecheck	February 25, 2005 letter	A-84	A.2.8
MPS-47-33	E. Grecheck	February 25, 2005 letter	A-84	A.2.8
MPS-47-34	E. Grecheck	February 25, 2005 letter	A-84	A.2.8
MPS-47-35	E. Grecheck	February 25, 2005 letter	A-84	A.2.8
MPS-47-36	E. Grecheck	February 25, 2005 letter	A-84	A.2.8
MPS-47-37	E. Grecheck	February 25, 2005 letter	A-85	A.2.8
MPS-47-38	E. Grecheck	February 25, 2005 letter	A-58	A.2.5
MPS-47-39	E. Grecheck	February 25, 2005 letter	A-59	A.2.5
MPS-47-40	E. Grecheck	February 25, 2005 letter	A-59	A.2.5
MPS-47-41	E. Grecheck	February 25, 2005 letter	A-59	A.2.5
MPS-47-42	E. Grecheck	February 25, 2005 letter	A-62	A.2.5
MPS-47-43	E. Grecheck	February 25, 2005 letter	A-64	A.2.5
MPS-47-44	E. Grecheck	February 25, 2005 letter	A-59	A.2.5
MPS-47-45	E. Grecheck	February 25, 2005 letter	A-60	A.2.5
MPS-47-46	E. Grecheck	February 25, 2005 letter	A-60	A.2.5
MPS-47-47	E. Grecheck	February 25, 2005 letter	A-60	A.2.5
MPS-47-48	E. Grecheck	February 25, 2005 letter	A-60	A.2.5
MPS-47-49	E. Grecheck	February 25, 2005 letter	A-60	A.2.5
MPS-47-50	E. Grecheck	February 25, 2005 letter	A-85	A.2.8
MPS-47-51	E. Grecheck	February 25, 2005 letter	A-80	A.2.6
MPS-47-52	E. Grecheck	February 25, 2005 letter	A-60	A.2.5

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MPS-47-53	E. Grecheck	February 25, 2005 letter	A-127	A.2.11
MPS-47-54	E. Grecheck	February 25, 2005 letter	A-127	A.2.11
MPS-47-55	E. Grecheck	February 25, 2005 letter	A-131	A.2.12
MPS-48-1	J. Thorsen	February 20, 2005 letter	A-127	A.2.11
MPS-48-2	J. Thorsen	February 20, 2005 letter	A-48	A.2.3
MPS-49-1	R. Fromer	February 28, 2005 letter	A-127	A.2.11
MPS-50-1	R. Varney	March 1, 2005 letter	A-61	A.2.5
MPS-50-2	R. Varney	March 1, 2005 letter	A-61	A.2.5
MPS-50-3	R. Varney	March 1, 2005 letter	A-61	A.2.5
MPS-50-4	R. Varney	March 1, 2005 letter	A-65	A.2.5
MPS-50-5	R. Varney	March 1, 2005 letter	A-65	A.2.5
MPS-50-6	R. Varney	March 1, 2005 letter	A-65	A.2.5
MPS-50-7	R. Varney	March 1, 2005 letter	A-66	A.2.5
MPS-50-8	R. Varney	March 1, 2005 letter	A-66	A.2.5
MPS-50-9	R. Varney	March 1, 2005 letter	A-73	A.2.5
MPS-50-10	R. Varney	March 1, 2005 letter	A-66	A.2.5
MPS-50-11	R. Varney	March 1, 2005 letter	A-66	A.2.5
MPS-50-12	R. Varney	March 1, 2005 letter	A-69	A.2.5
MPS-50-13	R. Varney	March 1, 2005 letter	A-69	A.2.5
MPS-50-14	R. Varney	March 1, 2005 letter	A-76	A.2.5
MPS-50-15	R. Varney	March 1, 2005 letter	A-71	A.2.5
MPS-50-16	R. Varney	March 1, 2005 letter	A-71	A.2.5
MPS-51-1	N. Burton	March 2, 2005 email	A-48	A.2.3
MPS-51-2	N. Burton	March 2, 2005 email	A-92	A.2.9
MPS-51-3	N. Burton	March 2, 2005 email	A-116	A.2.9
MPS-51-4	N. Burton	March 2, 2005 email	A-106	A.2.9
MPS-51-5	N. Burton	March 2, 2005 email	A-106	A.2.9
MPS-52-1	S. Levy	February 23, 2005 letter	A-42	A.2.1
MPS-52-2	S. Levy	February 23, 2005 letter	A-45	A.2.1
MPS-52-3	S. Levy	February 23, 2005 letter	A-134	A.2.13
MPS-52-4	S. Levy	February 23, 2005 letter	A-142	A.2.13
MPS-52-5	S. Levy	February 23, 2005 letter	A-73	A.2.5
MPS-52-6	S. Levy	February 23, 2005 letter	A-130	A.2.12
MPS-53-1	H. Walter	February 25, 2005 email	A-48	A.2.3
MPS-53-2	H. Walter	February 25, 2005 email	A-135	A.2.13
MPS-53-3	H. Walter	February 25, 2005 email	A-50	A.2.4
MPS-53-4	H. Walter	February 25, 2005 email	A-75	A.2.5
MPS-54-1	M. Brock	February 25, 2005 email	A-48	A.2.3
MPS-55-1	S. Pafenyk	February 26, 2005 email	A-135	A.2.13
MPS-55-2	S. Pafenyk	February 26, 2005 email	A-92	A.2.9

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MPS-55-3	S. Pafenyk	February 26, 2005 email	A-79	A.2.5
MPS-56-1	C. Case	February 27, 2005 email	A-49	A.2.3
MPS-56-2	C. Case	February 27, 2005 email	A-50	A.2.4
MPS-56-3	C. Case	February 27, 2005 email	A-75	A.2.5
MPS-56-4	C. Case	February 27, 2005 email	A-135	A.2.13
MPS-57-1	K. McGraw	February 26, 2005 email	A-49	A.2.3
MPS-57-2	K. McGraw	February 26, 2005 email	A-135	A.2.13
MPS-57-3	K. McGraw	February 26, 2005 email	A-50	A.2.4
MPS-57-4	K. McGraw	February 26, 2005 email	A-75	A.2.5
MPS-58-1	J. Porter	February 28, 2005 email	A-49	A.2.3
MPS-58-2	J. Porter	February 28, 2005 email	A-135	A.2.13
MPS-58-3	J. Porter	February 28, 2005 email	A-50	A.2.4
MPS-58-4	J. Porter	February 28, 2005 email	A-75	A.2.5
MPS-59-1	A. Benners	February 28, 2005 email	A-49	A.2.3
MPS-59-2	A. Benners	February 28, 2005 email	A-135	A.2.13
MPS-59-3	A. Benners	February 28, 2005 email	A-51	A.2.4
MPS-59-4	A. Benners	February 28, 2005 email	A-75	A.2.5
MPS-60-1	J. Bloom	February 28, 2005 email	A-49	A.2.3
MPS-60-2	J. Bloom	February 28, 2005 email	A-135	A.2.13
MPS-60-3	J. Bloom	February 28, 2005 email	A-92	A.2.9
MPS-60-4	J. Bloom	February 28, 2005 email	A-79	A.2.5
MPS-61-1	Judi	February 28, 2005 email	A-51	A.2.4
MPS-61-2	Judi	February 28, 2005 email	A-75	A.2.5
MPS-61-3	Judi	February 28, 2005 email	A-49	A.2.3
MPS-62-1	M. Schwartz	February 28, 2005 email	A-49	A.2.3
MPS-62-2	M. Schwartz	February 28, 2005 email	A-92	A.2.9
MPS-62-3	M. Schwartz	February 28, 2005 email	A-127	A.2.11
MPS-63-1	A. Martin	February 28, 2005 email	A-49	A.2.3
MPS-63-2	A. Martin	February 28, 2005 email	A-135	A.2.13
MPS-63-3	A. Martin	February 28, 2005 email	A-51	A.2.4
MPS-63-4	A. Martin	February 28, 2005 email	A-92	A.2.9
MPS-64-1	J. Rooney	March 2, 2005 email	A-49	A.2.3
MPS-64-2	J. Rooney	March 2, 2005 email	A-135	A.2.13
MPS-64-3	J. Rooney	March 2, 2005 email	A-51	A.2.4
MPS-65-1	A. Levitt	February 25, 2005 email	A-49	A.2.3
MPS-65-2	A. Levitt	February 25, 2005 email	A-92	A.2.9
MPS-65-3	A. Levitt	February 25, 2005 email	A-42	A.2.1
MPS-65-4	A. Levitt	February 25, 2005 email	A-139	A.2.13
MPS-65-5	A. Levitt	February 25, 2005 email	A-83	A.2.8
MPS-66-1	M. Baran	February 25, 2005 email	A-49	A.2.3
MPS-66-2	M. Baran	February 25, 2005 email	A-135	A.2.13

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MPS-66-3	M. Baran	February 25, 2005 email	A-51	A.2.4
MPS-66-4	M. Baran	February 25, 2005 email	A-75	A.2.5
MPS-67-1	A. Tillman	February 25, 2005 email	A-49	A.2.3
MPS-67-2	A. Tillman	February 25, 2005 email	A-136	A.2.13
MPS-68-1	K. Faraone	March 2, 2005 email	A-136	A.2.13
MPS-68-2	K. Faraone	March 2, 2005 email	A-51	A.2.4
MPS-68-3	K. Faraone	March 2, 2005 email	A-75	A.2.5
MPS-68-4	K. Faraone	March 2, 2005 email	A-49	A.2.3
MPS-69-1	K. Elenteny	March 2, 2005 email	A-49	A.2.3
MPS-69-2	K. Elenteny	March 2, 2005 email	A-92	A.2.9
MPS-69-3	K. Elenteny	March 2, 2005 email	A-79	A.2.5
MPS-70-1	A. Greene	March 2, 2005 email	A-136	A.2.13
MPS-70-2	A. Greene	March 2, 2005 email	A-51	A.2.4
MPS-70-3	A. Greene	March 2, 2005 email	A-75	A.2.5
MPS-71-1	R. MacNish	February 25, 2005 email	A-49	A.2.3
MPS-72-1	J. Horton	March 2, 2005 letter	A-42	A.2.1
MPS-72-2	J. Horton	March 2, 2005 letter	A-136	A.2.13
MPS-72-3	J. Horton	March 2, 2005 letter	A-43	A.2.1
MPS-73-1	G. Schroeder	March 1, 2005 email	A-50	A.2.3
MPS-73-2	G. Schroeder	March 1, 2005 email	A-43	A.2.1
MPS-73-3	G. Schroeder	March 1, 2005 email	A-137	A.2.13
MPS-73-4	G. Schroeder	March 1, 2005 email	A-139	A.2.13
MPS-74-1	A. Raddant	February 28, 2005 letter	A-47	A.2.2
MPS-75-1	J. Wallmuller	January 17, 2005 email	A-50	A.2.3
MPS-76-1	Carjam10 @aol.com	January 16, 2005 email	A-137	A.2.13
MPS-77-1	A. Gobin	March 2, 2005 letter	A-128	A.2.11
MPS-78-1	M. Domenici	January 12, 2005 email	A-43	A.2.1
MPS-79-1	D. Downes	March 7, 2005 letter	A-47	A.2.2
MPS-79-2	D. Downes	March 7, 2005 letter	A-143	A.2.13
MPS-79-3	D. Downes	March 7, 2005 letter	A-143	A.2.13
MPS-80-1	L. Kaley	March 11, 2005 email	A-124	A.2.10
MPS-80-2	L. Kaley	March 11, 2005 email	A-125	A.2.11
MPS-81-1	J. Calandrelli	March 18, 2005email	A-125	A.2.11
MPS-81-2	J. Calandrelli	March 18, 2005email	A-137	A.2.13
MPS-81-3	J. Calandrelli	March 18, 2005email	A-83	A.2.8
MPS-81-4	J. Calandrelli	March 18, 2005email	A-92	A.2.9
MPS-81-5	J. Calandrelli	March 18, 2005email	A-140	A.2.13
MPS-81-6	J. Calandrelli	March 18, 2005email	A-126	A.2.11
MPS-81-7	J. Calandrelli	March 18, 2005email	A-50	A.2.3

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MPS-82-1	N. Burton	March 16, 2005 letter	A-44	A.2.1
MPS-82-2	N. Burton	March 16, 2005 letter	A-144	A.2.13
MPS-82-3	N. Burton	March 16, 2005 letter	A-52	A.2.4
MPS-82-4	N. Burton	March 16, 2005 letter	A-44	A.2.1
MPS-82-5	N. Burton	March 16, 2005 letter	A-116	A.2.9
MPS-82-6	N. Burton	March 16, 2005 letter	A-107	A.2.9
MPS-82-7	N. Burton	March 16, 2005 letter	A-45	A.2.1
MPS-82-8	N. Burton	March 16, 2005 letter	A-92	A.2.9
MPS-82-9	N. Burton	March 16, 2005 letter	A-74	A.2.5
MPS-82-10	N. Burton	March 16, 2005 letter	A-52	A.2.4
MPS-82-11	N. Burton	March 16, 2005 letter	A-93	A.2.9
MPS-82-12	N. Burton	March 16, 2005 letter	A-100	A.2.9
MPS-82-13	N. Burton	March 16, 2005 letter	A-145	A.2.13
MPS-82-14	N. Burton	March 16, 2005 letter	A-85	A.2.8
MPS-82-15	N. Burton	March 16, 2005 letter	A-93	A.2.9
MPS-82-16	N. Burton	March 16, 2005 letter	A-116	A.2.9
MPS-82-17	N. Burton	March 16, 2005 letter	A-116	A.2.9
MPS-82-18	N. Burton	March 16, 2005 letter	A-145	A.2.13
MPS-82-19A	N. Burton	March 16, 2005 letter	A-111	A.2.9
MPS-82-19B	N. Burton	March 16, 2005 letter	A-93	A.2.9
MPS-82-20	N. Burton	March 16, 2005 letter	A-145	A.2.13
MPS-82-21	N. Burton	March 16, 2005 letter	A-78	A.2.5
MPS-82-22	N. Burton	March 16, 2005 letter	A-141	A.2.13
MPS-82-23	N. Burton	March 16, 2005 letter	A-52	A.2.4
MPS-82-24	N. Burton	March 16, 2005 letter	A-107	A.2.9
MPS-82-25	N. Burton	March 16, 2005 letter	A-140	A.2.13
MPS-82-26	N. Burton	March 16, 2005 letter	A-111	A.2.9
MPS-82-27	N. Burton	March 16, 2005 letter	A-93	A.2.9
MPS-82-28	N. Burton	March 16, 2005 letter	A-94	A.2.9
MPS-82-29	N. Burton	March 16, 2005 letter	A-140	A.2.13
MPS-82-30	N. Burton	March 16, 2005 letter	A-94	A.2.9
MPS-82-31	N. Burton	March 16, 2005 letter	A-94	A.2.9
MPS-82-32	N. Burton	March 16, 2005 letter	A-117	A.2.9
MPS-82-33	N. Burton	March 16, 2005 letter	A-107	A.2.9
MPS-82-34	N. Burton	March 16, 2005 letter	A-45	A.2.1
MPS-82-35	N. Burton	March 16, 2005 letter	A-109	A.2.9
MPS-82-36	N. Burton	March 16, 2005 letter	A-102	A.2.9
MPS-82-37	N. Burton	March 16, 2005 letter	A-107	A.2.9
MPS-82-38	N. Burton	March 16, 2005 letter	A-102	A.2.9
MPS-82-39	N. Burton	March 16, 2005 letter	A-117	A.2.9
MPS-82-40	N. Burton	March 16, 2005 letter	A-117	A.2.9

Comment ID	Commenter	Source	Comment Location	Section(s) Where Addressed
MPS-82-41	N. Burton	March 16, 2005 letter	A-107	A.2.9
MPS-82-42	N. Burton	March 16, 2005 letter	A-119	A.2.9
MPS-82-43	N. Burton	March 16, 2005 letter	A-120	A.2.9
MPS-82-44	N. Burton	March 16, 2005 letter	A-120	A.2.9
MPS-82-45	N. Burton	March 16, 2005 letter	A-79	A.2.5
MPS-82-46	N. Burton	March 16, 2005 letter	A-77	A.2.5
MPS-82-47	N. Burton	March 16, 2005 letter	A-78	A.2.5
MPS-82-48	N. Burton	March 16, 2005 letter	A-77	A.2.5
MPS-82-49	N. Burton	March 16, 2005 letter	A-100	A.2.5
MPS-82-50	N. Burton	March 16, 2005 letter	A-70	A.2.5
MPS-82-51	N. Burton	March 16, 2005 letter	A-67	A.2.5
MPS-82-52	N. Burton	March 16, 2005 letter	A-68	A.2.5
MPS-82-53	N. Burton	March 16, 2005 letter	A-70	A.2.5
MPS-82-54	N. Burton	March 16, 2005 letter	A-72	A.2.5
MPS-82-55	N. Burton	March 16, 2005 letter	A-118	A.2.9
MPS-82-56	N. Burton	March 16, 2005 letter	A-94	A.2.9
MPS-82-57	N. Burton	March 16, 2005 letter	A-118	A.2.9
MPS-82-58	N. Burton	March 16, 2005 letter	A-111	A.2.9
MPS-82-59	N. Burton	March 16, 2005 letter	A-111	A.2.9
MPS-82-60	N. Burton	March 16, 2005 letter	A-74	A.2.5
MPS-82-61	N. Burton	March 16, 2005 letter	A-101	A.2.9
MPS-82-62	N. Burton	March 16, 2005 letter	A-81	A.2.8
MPS-82-63	N. Burton	March 16, 2005 letter	A-94	A.2.9
MPS-82-64	N. Burton	March 16, 2005 letter	A-83	A.2.8
MPS-82-65	N. Burton	March 16, 2005 letter	A-94	A.2.9
MPS-82-66	N. Burton	March 16, 2005 letter	A-94	A.2.9
MPS-82-67	N. Burton	March 16, 2005 letter	A-109	A.2.9
MPS-82-68	N. Burton	March 16, 2005 letter	A-109	A.2.9
MPS-82-69	N. Burton	March 16, 2005 letter	A-95	A.2.9
MPS-82-70	N. Burton	March 16, 2005 letter	A-95	A.2.9
MPS-82-71	N. Burton	March 16, 2005 letter	A-96	A.2.9
MPS-82-72	N. Burton	March 16, 2005 letter	A-96	A.2.9
MPS-82-73	N. Burton	March 16, 2005 letter	A-96	A.2.9
MPS-82-74	N. Burton	March 16, 2005 letter	A-97	A.2.9
MPS-82-75	N. Burton	March 16, 2005 letter	A-97	A.2.9
MPS-82-76	N. Burton	March 16, 2005 letter	A-97	A.2.9
MPS-82-77	N. Burton	March 16, 2005 letter	A-97	A.2.9
MPS-82-78	N. Burton	March 16, 2005 letter	A-98	A.2.9
MPS-82-79	N. Burton	March 16, 2005 letter	A-98	A.2.9
MPS-82-80	N. Burton	March 16, 2005 letter	A-98	A.2.9

Comment ID	Commenter	Source	Comment Location	Section(s) Where Addressed
MPS-82-81	N. Burton	March 16, 2005 letter	A-99	A.2.9
MPS-82-82	N. Burton	March 16, 2005 letter	A-99	A.2.9
MPS-82-83	N. Burton	March 16, 2005 letter	A-114	A.2.9
MPS-82-84	N. Burton	March 16, 2005 letter	A-101	A.2.9
MPS-83-1	N. Burton	March 21, 2005 letter	A-53	A.2.4
MPS-83-2	N. Burton	March 21, 2005 letter	A-53	A.2.4
MPS-83-3	N. Burton	March 21, 2005 letter	A-100	A.2.9
MPS-83-4	N. Burton	March 21, 2005 letter	A-75	A.2.5
MPS-83-5	N. Burton	March 21, 2005 letter	A-100	A.2.9
(a) The accession number for the transcripts and attachments is ML050540167.				

A.2 Comments and Responses

Comments in this section are grouped into the following categories:

1. Comments Regarding the License Renewal Process
2. Comments in Support of License Renewal at Millstone Power Station, Units 2 and 3
3. Comments in Opposition to License Renewal at Millstone Power Station, Units 2 and 3
4. Comments Concerning Water Use and Quality
5. Comments Concerning Aquatic Ecology
6. Comments Concerning Terrestrial Resources
7. Comments Concerning Air Quality
8. Comments Concerning Socioeconomics
9. Comments Concerning Human Health
10. Comments Concerning Uranium Fuel Cycle and Waste Management
11. Comments Concerning Alternatives
12. Comments Concerning Postulated Accidents
13. Comments Concerning Issues Outside the Scope of the Environmental Review for License Renewal: Emergency Response and Preparedness, Safeguards and Security, Operational Safety, Aging Management, Need for Power, and Regulatory History

1. Comments Regarding the License Renewal Process

Comment: I would join with the gentleman from Southold in asking the NRC to disband these proceedings. They are flawed procedurally. (MPS-2-10)

Comment: That is necessarily the case, because even though a portion of my town -- Southold town -- is located within the EPZ of Millstone, and the rest of my town is just a short ferry ride away, my office received no official notification of these hearings. That's the first I'm hearing of a scoping session. (MPS-8-2)

Comment: Your EIS, the process, not even the EIS, skip the EIS, the process alone is flawed, and you've got to start over. You've got to start over with all of us involved. (MPS-8-3)

Comment: And, furthermore, that no permits for this facility be granted until such data is compiled, disseminated, thoroughly discussed in public, and its findings implemented. (MPS-8-6)

Comment: I call upon the NRC -- and this I hope is reflected in your responses -- I call upon the NRC to request input and guidance from United States Senators Schumer, Clinton, Lieberman, and Dodd. And I don't want it from their aides. I think it's got to come from their mouths. I think you have to have a conference, a senatorial conference, and seek their input.

The same must be sought from Governors Rell and Pataki. In addition, NRC must seek the counsel and input from Representative Tim Bishop of the First Congressional District of New York, and his colleagues in Connecticut. The testimony of these officials must be incorporated into the GEIS and addressed within. (MPS-8-7)

Comment: The hearing was poorly noticed. Although the hearing may have met the legal requirements for notification, very few stakeholders in the North Fork were aware of today's hearing, or, for that matter, the entire scoping process -- we certainly were not given ample time to fully read, consider, and prepare thoughtful comment on the generic environmental impact statement for license renewal of nuclear power plants or the 449-page draft supplemental environmental impact statement, which examines the renewal of the Millstone licenses specifically.

Because the actions of the NRC in this licensing renewal process will affect the residents of the North Fork and Long Island, we request that the NRC hold an additional public hearing on Long Island. (MPS-9-5)

Comment: ... as a community 10 miles across the pond, we are underrepresented here today because the turnaround time of notification was too short a time for anyone to really rally the troops. And, frankly, I find that a little bit -- a little disingenuous on behalf of the NRC, not to make it a point to speak to your neighbors. (MPS-10-1)

Comment: The people who weren't here earlier don't know that Long Island wasn't notified of this meeting. The supervisor of the Town of Southhold, 22,000 people, his jurisdiction extends over Fisher's Island, which is within the 10-mile evacuation zone, they were not notified of this proceeding until the last minute.

They came. They protested. They pointed out -- and I would agree with them -- the defect of this proceeding by failure of notice. Under Federal law, National Environmental Protection Act requires meaningful public opportunities for public participation. And that is at the basis of it. (MPS-23-13)

Comment: Speaking for the New Haven Chapter of the Green Party, we feel the draft EIS, as proposed, is flawed, and thus a new process should be initiated with hearings that include all stakeholders and their concerns. (MPS-28-8)

Comment: I would like to protest your scheduling a vital public meeting on operations at the Millstone nuclear plant without adequately notifying the residents who would be effected if an accident should happen. I read the New York Times every day. No notice was published. It looks like you didn't want anyone to know there was a meeting. (MPS-38-1)

Comment: I wish to register my opinion that license renewal for Millstone nuclear power plant be delayed. All the parties who have concerns about this renewal have not been fully heard. These parties include Long Island communities, citizen groups and anti-nuclear activists. The health effects of this power plant may not have been fully considered. As a consequence, I urge you to delay renewal of the license. (MPS-42-1)

Comment: In the future, when posting "public meetings" I recommend the NRC place your notifications in no less than 3 newspapers:

1. NY Times
2. Newsday
3. Suffolk Times

The Easthampton Independent is a free newspaper that is distributed in local supermarkets and is not necessarily a well read newspaper. So, in fairness to the residents of Long Island, it would be prudent on your behalf to place your public notifications in the 3 newspapers stated above. If you require contact info on these newspapers, I will be happy to provide that information. Additionally, on January 12, I sent an email to Mr. Zalcman providing him with all the elected officials contact information, from the Town Supervisor all the way up to Governor Pataki to ensure that future notifications were made as appropriate. If you would like a copy of that email, please contact me.

Lastly, I ask that I be added as a contact name for future will be conducted as it relates to Millstone. (MPS-43-1)

Comment: The hearing was poorly noticed, perhaps meeting legal requirements, but missing the major avenues for correctly notifying the public on the North Fork of Long Island. Consequently we did not have enough time to read and consider the GEIS or SEIS. (MPS-44-1)

Comment: The County of Suffolk finds the document overly narrow in scope, and lacking detail with regard to the issues of concern to the 1.4 million residents of our county. It appears that public notifications to areas in Suffolk County within the 10 and 50 mile emergency planning zones were neglected; that there is no need to rush operating license renewal for the plants decades prior to their license expiration; and, that radiological emergency evacuation plans for Suffolk County were not addressed.

I was dismayed that a public hearing was not held in Suffolk County concerning the renewal application and that the Commission filed to contact local municipalities and environmental groups on eastern Long Island (Supplement 22, Appendix D, Organizations Contacted). An analysis of major points of view concerning significant problems and objections raised by federal, state or local agencies is required by 10 CFR 51.71 in a draft environmental impact statement. In accordance with NRC policy regarding public involvement in reactor license renewal and as Suffolk County residents may be adversely affected by the renewal, we request that a public hearing be held in Suffolk County where the NRC and Dominion can respond to these issues. (MPS-52-1)

Comment: I would appreciate your consideration of a new hearing to include all stakeholders, including nearby Long Island Communities, as the effects are far-reaching. (MPS-65-3)

Comment: On January 11, 2005, I appeared and made comments on the record on behalf of the residents of the Town of Southold at the public hearing on the Draft Environmental Impact Statement (DEIS) for the proposed renewal of the operating licenses for the Millstone Power Station, Units 2 and 3. Those comments stand; these written comments serve as supplemental objections to the renewal of those licenses in the absence of the due consideration for the safety of the affected nearby Long Island residents.

Furthermore, I hereby join in the request of other parties, including, without limitation, the Connecticut Coalition Against Millstone, for an extension of time in which to submit written comments due to the failure of the NRC to make available for review relevant documents such as the transcript of the January 11, 2005 hearing.

In the first instance, I object that the Town of Southold was given no notice whatsoever of the "scoping process" that was apparently held in this purportedly public environmental review procedure. It is precisely because we were not included in this process, and not afforded the opportunity to "identify the significant issues to be analyzed in depth", that critical issue of the safety of Long Island residents has been completely omitted from the environmental review. (MPS-72-1)

Comment: Clearly, as far as safety of affected residents is concerned, the environmental review process has not yet begun. Since this is a matter of federal concern, and which is the subject of federal regulation, it is crucial that the NRC seek and heed the input of the federal elective officials in the surrounding areas for their input regarding the concerns of their constituents. The NRC must, therefore, seek formal input from the Senators and Representatives in New York as well as Connecticut.

Furthermore, the NRC must appropriate funding and conduct a proper study for the evacuation of eastern Long Island residents, which should then be included as part of the DEIS, and subject to public input, at a forum Long Island residents can attend - on Long Island. The DEIS must not, and cannot move forward until these crucial matters are properly considered and integrated into the document. (MPS-72-3)

Comment: If the NRC is not prepared to deny the request of Dominion to renew the operating license for the Millstone reactors, we request, at the very least, that the NRC hold an additional public hearing on Long Island. The actions of the NRC in this licensing renewal process will affect residents of the North Fork and it is morally reprehensible to deny our voice in the process. The January hearing held in Ct. was poorly noticed. Although the hearing may have met the legal requirements for notification, very few stakeholders on the North Fork were aware of the hearing, or for that matter, the entire scoping process. We certainly were not given ample time to fully read, consider and prepare thoughtful comments on the Generic Environmental Impact Statement (GEIS) for License Renewal of Nuclear Plants or the 449 page draft Supplemental Environmental Impact Statement (SEIS) which examines the renewal of the Millstone licenses specifically. (MPS-73-2)

Comment: Lastly, I would like to provide you with contact information of our local representatives who should be put on your list of "people to contact" representing Long Island & NYS. These individuals should be advised of future meetings as it relates to the Millstone Power Plant license renewal or other matters relating to this plant. Please ensure your community affairs people have this information for future reference. Additionally, would like to recommend conducting this licensing meeting on Long Island for "public" feedback. If you would like to plan a meeting on Long Island, I recommend you contact one of the individuals listed below to determine a mutually agreeable location. (MPS-78-1)

Response: *The comments criticize the public noyification process used by the NRC in conducting the environmental review of the Millstone license renewal applications. The public notification process included publication of several notices in the Federal Register, multiple advertisements in four newspapers distributed in Connecticut and Long Island, press releases, meeting notices, and flyers. Contacts were also made with interest groups and elected officials. This issue is not within the scope of this environmental review. The comments provide no new and significant information, therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.*

Comment: Small, medium, and large. You guys spoke about that. It's meaningless. It's all relative. And, really, to say an impact is small, you have no figures or no numbers. It's all through the book. It really doesn't mean a lot to me. (MPS-18-6)

Comment: I don't understand why socioeconomics is part of this report. It's an environmental report. Do you mean socioeconomic environment versus a natural environment? Because the emphasis in the report is on socioeconomics. It is not the NRC's job to be concerned with the economic impact of relicensing. And you did mention that you have to have that.

My comment on this aspect of the report is a strong objection to the emphasis placed on the economic impact of relicensing. (MPS-18-11)

Comment: In one instance, the way numbers are handled, $1.5 times 10^9, when I have no idea whether that was an attempt to obfuscate or just an engineer writing that, but it should have been one and a half billion dollars for the cost of the catastrophic cleanup. (MPS-19-2)

Comment: The NRC staff has preliminarily concluded in its draft Environmental Impact Statement that the adverse environmental impacts of license renewal are not so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable.

This conclusion is clearly erroneous and based on incorrect and incomplete in formation, industry bias and flawed analysis. It also manifests a profound disregard for the health and welfare of the community.

This conclusion ignores substantial available evidence that Millstone operations have had and will continue to have devastating health impacts on a wide scale and will continue to cause irreversible environmental damage on a wide scale. (MPS-82-1)

Comment: For this reason, each of the environmental issues required for consideration in the Environmental Impact Statement process should be considered to be a Category 2 issue, subject to site-specific consideration. (MPS-82-4)

Comment: We perceive a determined lack of dedication by the NRC staff to genuinely understand the full scope of environmental - including human health - impacts of continued operations of Millstone. Documents which we provided to the NRC have apparently been destroyed. Comments made in relicensing proceedings attended by the SEIS staff and documents submitted in such proceedings were ignored or disregarded by the SEIS staff.

We continue to be troubled by the fact that documents produced by the SEIS staff in response to our queries about the SEIS submitted to the SEIS staff on January 23, 2005 were withheld by the NRC's own Freedom of Information staff and have yet to be released. (MPS-82-7)

Comment: Given all these facts and circumstances, the application of a "Generic Environmental Impact Statement" to Millstone, thereby precluding site-specific analysis in the Environmental Impact Statement, is so deeply flawed as to be fraudulent.

The Coalition and others have provided "new and significant" information which compels the NRC to conduct a site-specific analysis of the environmental impacts of relicensing Millstone Units 2 and 3. See discussion at pages 32 *et seq. infra.* (MPS-82-34)

Response: *The commenters disagree with the staff's analysis approach. The environmental review was conducted in accordance with NUREG-1555, Supplement 1, Environmental Standard Review Plan Supplement 1: Operating License Renewal. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.*

Comment: Suffolk County views the applications to renew Millstone's operating licenses as premature at this time. The current operating licenses do not expire for periods of 10 and 20 years, until July 2015 for Unit 2 and November 2025 for Unit 3. With the advance of science in the next two decades, it is likely that alternative cleaner energy sources and/or conservation will negate the need for license renewal for outmoded and hazardous nuclear generating plants. It is clearly self-serving for the Commission to conclude that environmental impacts for future generating and conservation alternatives would be greater than those operating Millstone (Supplement 22, pages xix and 8-51). The NRC Fact Sheet on Reactor License Renewal states that the license renewal procedure is expected to take no more than 30 months. Why then is there a push to renew operating licenses decades before it is necessary to perform such a review? (MPS-52-2)

Response: *The comment opposes the timing of the license renewal process. 10 CFR 54.17(c) allows licensees to submit license renewal applications up to 20 years before the expiration of the current license. The time period is intended to allow licensees time to plan and build replacement power generating capacity if license renewal is not granted. The comment provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.*

2. Comments in Support of License Renewal at Millstone Power Station, Units 2 and 3

Comment: I was Selectman when Millstone had a lot of difficulty and when, quite frankly, the process was not like the process that I see here today. The process was quite unfair, quite awkward, and certainly wasn't as fair or as balanced as it seems to be today. So I appreciate the learning that both the NRC has done, and certainly it seems to be a lot more fair than the days of -- my Selectman days where we'd sit here night after night listening to NRC speak the speak and really not address the issue.

Today there is a valid attempt -- and I have seen that now for several meetings -- a valid attempt to take into consideration public comments. What I did when I was First Selectman -- and this is a little bit of criticism -- I allowed the people of eastern Connecticut to come and speak first. They're the people who live here, work here, who pay the price one way or the other of having nuclear power plants in their community.

With all due respect to our neighbors in Long Island, we would ask them to wait their turn. But that's another point. (MPS-12-2)

Comment: I'd like to note that in my opinion the NRC has been very thorough and very detailed and very complete in the material that has been presented to them to date, and the information and the conclusions that are in this report. (MPS-13-1)

Comment: Upon review of this report, I submit the following comments for the record. I support the staff conclusions and recommendations that are contained in Section 9.3. I also reiterate our support for the relicensing of Millstone 2 and Millstone 3, as is documented on page A-14 of this report. (MPS-13-2)

Comment: First, let me say I appreciate and support the preliminary recommendations of the NRC staff, which states that the Commission determined that the adverse environmental impacts of license renewal for Millstone are not so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable. (MPS-14-1)

Comment: I want to speak in support of the relicensing effort by the power plant. The Town of Waterford, the surrounding communities, as well as the State of Connecticut have very clearly benefitted from its presence here in Waterford for many years. (MPS-20-1)

Comment: This community supports nuclear power. (MPS-21-3)

Comment: And I do hope that to the extent technically feasible, you will extend the licenses of these plants as long as possible. (MPS-21-4)

Comment: The Southeastern Connecticut Central Labor Council, AFL-CIO has voted to support the renewal of the operating license for Millstone Power Station.

Many of our members and delegates have lived and worked in Southeastern Connecticut since Millstone Power Station started unit one. The Power Station has had some problems over the years. However, we believe the current management, Dominion Nuclear, Inc has demonstrated responsible behavior, has been a good member of the community and has worked to provide good jobs for citizens in Southeastern Connecticut.

Therefore we support the license renewal of units two and three at Millstone power station. (MPS-33-1)

Comment: The Department of the Interior (Department) has reviewed the Draft Supplemental Environmental Impact Statement (SEIS), NUREG-1437, Supplement 22, regarding Millstone Power Station, Units 2 and 3. The Department has no comment on, or concern with the Draft Supplemental Environmental Impact Statement. (MPS-74-1)

Comment: The Connecticut Department of Public Utility Control (Department) submits this letter in support of the Application for Renewed Operating License for Millstone Power Station, located in Waterford, Connecticut. (MPS-79-1)

Response: *The comments are supportive of license renewal and its processes and are general in nature. The comments are consistent with the conclusions in this SEIS. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.*

3. General Comments in Opposition to License Renewal at Millstone

Comment: I'm against the operation of Millstone right now, and I certainly don't think it should be relicensed. (MPS-3-13)

Comment: And we certainly will not subscribe to this impact statement that's being presented today. (MPS-4-2)

Comment: In conclusion, the NFEC wishes to go on record as being in opposition to the license renewal of Millstone Power Station's Units 2 and 3,... (MPS-9-6)

Comment: I go on record as opposing the issuance of this license. (MPS-10-7)

Comment: We urge you not to relicense Millstone. Relicensing is a recipe for disaster. (MPS-11-6)

Comment: I'm saddened by the thought of 20 more years of Millstone operating and saddened for future generations, which will be adversely affected by our need and our greed for more nuclear electricity. (MPS-18-13)

Comment: What I neglected to say was that our review of this document shows it is very seriously flawed. If this is an environmental impact statement, it is difficult to understand why it omits to analyze the chief environmental impacts of this nuclear power plant on this community. (MPS-23-1)

Comment: I write to you today on behalf of my family and close friends who all live near the Millstone Nuclear Plant. It has come to our attention that although the plant has already outlived its intended life span, it is slated for re-licensing for another 20 years. We strongly oppose this decision and regard it as shortsighted and foolhardy. (MPS-26-1)

Comment: The Green Party of New Haven opposes extension of operating licenses for Millstone's 2 and 3 nuclear power reactors in Waterford, Connecticut, ... (MPS-28-1)

Comment: I want to go on record as Opposing the renewal for licensing for Units 2 and 3. (MPS-30-1)

Comment: Hello NRC staff. I would like to not see a renewal of Units 2 & 3 at the Millstone Power Plant site in CT. (MPS-34-1)

Comment: I am a former Long Island resident and I strongly oppose the relicensing of the Millestone Nuclear Power Plant, Units 2 and 3 to the year 2045. (MPS-35-1)

Comment: I am a Long Island resident and I strongly oppose the relicensing of the Millestone Nuclear Power Plant, Units 2 and 3 to the year 2045. (MPS-37-1)

Comment: I urge you to not allow the Millstone nuclear facilities to operate for all the safety, toxic waste, public health and national security reasons cited by so many for so long and documented over the years by members of the scientific community who have no economic or other pecuniary interests in the Millstone projects. (MPS-39-1)

Comment: We want to voice our concern about the renewal of the Millstone Power Plant license. We are strongly opposed to this, and hope that you will consider closing the plant. (MPS-40-1)

Comment: I have read the available information sent to me about Millstone. I am deeply distressed that you would even consider extending the opening of this facility. It seems that it would be common sense with all the other data in the world about this type of situation, that you would have no reason to keep this open or to extend the opening of it. (MPS-41-1)

Comment: Close Millstone Power Station 2 & 3 at once. (MPS-45-1)

Comment: Therefor, I hope you will not renew this license. (MPS-48-2)

Comment: The Coalition strongly opposes Millstone relicensing. (MPS-51-1)

Comment: I urge you to deny Millstone's Relicensing (MPS-53-1)

Comment: Please deny the license extension to Millstone. (MPS-54-1)

Comment: Gentlemen: It is very upsetting to learn that you are considering relicensing the Millstone plant with all the negative considerations ... How can you be thinking of this? Millstone must be shut down. Dont fool with our lives! (MPS-56-1)

Comment: As a property owner on Long Island Sound at Northville Beach, I am opposed to the relicensing of the Millstone Nuclear Plant. (MPS-57-1)

Comment: I oppose renewing the license on the Millbrook [sic] Nuke. I feel it threatens the safety and security of Eastern Long Islanders. I am a US Citizen that votes. (MPS-58-1)

Comment: Deny license extension to Millstone. (MPS-59-1)

Comment: Please deny Millstone's operating license. (MPS-60-1)

Comment: CLOSE MILLSTONE PLEASE. (MPS-61-3)

Comment: I am a resident of Connecticut and I am writing to you to strongly urge you to deny the renewal of the license for this plant. (MPS-62-1)

Comment: My husband and I live in Greenport NY and are seriously opposed to the relicensing of Millstone. (MPS-63-1)

Comment: Do NOT reissue license to Millstone reactor in Connecticut. (MPS-64-1)

Comment: I am writing to oppose the license renewal for the millstone nuclear reactors in Waterford. (MPS-65-1)

Comment: I wish to voice my opposition to the Millstone Nuclear power plant.... (MPS-66-1)

Comment: I want to go on record as being against the re licensing of Millstone. (MPS-67-1)

Comment: Please do not allow this power plant to reopen without mitigation of the above impacts. (MPS-68-4)

Comment: I am writing to inform you that as a resident of New London County, I am in opposition of the license extension of Millstone. (MPS-69-1)

Comment: My family, (which consists of my 4 children and my wife) and myself are opposed to the re licensing of Millstones Units 2 & 3. (MPS-71-1)

Comment: On behalf of NFEC, I am writing to strongly oppose the relicensure of the Millstone Nuclear Reactors and to express my grave concerns about their continued operation. (MPS-73-1)

Comment: I am against Millstone Nuclear Power Plant which is located in Connecticut renewing its operating licenses. (MPS-75-1)

Comment: ... do not renew the Millstone licence. (MPS-81-7)

Response: *The comments are in opposition to license renewal and are general in nature. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.*

4. Comments Concerning Water Use and Quality

Comment: Those are the same expired and illegal permits that the NRC today is saying are perfectly valid and permit Millstone to kill fish, discharge waste -- radioactive waste and caustic chemicals in the Sound. (MPS-2-9)

Comment: Millstone has been operating with an expired Clean Water Act discharge permit since 1997. The Clean Water Act mandates permit holders to obtain five-year permits so that every five years they will have to demonstrate that they have implemented best available technology to reduce or eliminate pollution if they want their permits renewed. Millstone has been able to get away with operating with non-updated technology an extra five years. (MPS-53-3, MPS-57-3, MPS-58-3, MPS-59-3, and MPS-66-3)

Comment: Millstone has been operating an expired clean water act permit for a full 5 years beyond the alloted time. (MPS-56-2)

Comment: Does Millstone have an updated Clean Water Act discharge permit? I understand their's expired in 1997. If this is true, why has it been allowed to operate without one??? (MPS-61-1)

Comment: ... this plant is functioning with an expired clean Water discharge permit for over 4 years time. (MPS-63-3)

Comment: ... its clean water permit is expired. (MPS-64-3)

Comment: Millstone has been operating with an expired Clean Water Act discharge permit since 1997. The Clean Water Act mandates permit holders to obtain five-year permits so that every five years they will have to demonstrate that they have implemented best available technology to reduce or eliminate pollution if they want their permits renewed. Millstone has been able to operate with non-updated technology for an additional five years with no consequence. (MPS-68-2)

Comment: Millstone has been operating with an expired Clean Water Act discharge permit since 1997. The Clean Water Act mandates permit holders to obtain five-year permits so that every five years they will have to demonstrate that they have implemented best available technology to reduce or eliminate pollution if they want their permits renewed. Millstone has been able to get away with operating with non-updated technology an extra five years. Why is Millstone allowed to subvert the intent of the law? (MPS-70-2)

Comment: Connecticut's regulatory apparatus has failed to safeguard the public. Millstone's five-year National Pollution [sic] Discharge Elimination System ("NPDES") permit expired on

December 14, 1997 – eight years ago - and it has not been renewed. Nevertheless, DEP has permitted Millstone to operate under the 1992 permit in brazen violation of the letter and spirit of the federal Clean Water Act. Former DEP Commissioner Arthur J. Rocque, Jr., routinely authorized "emergency authorizations" ("EAs") while recognizing his lack of legal authority to do so. These EAs – of indefinite duration permitting releases of toxic and carcinogenic substances without enforceable limits – permit Millstone's owners and operators to do, *inter alia*, what Northeast Utilities pleaded guilty to doing wilfully and illegally when it pleaded guilty in the U.S. District Court in September 1999 to committing environmental felonies at Millstone and paying a $10 million fine. Clearly, the Clean Water Act prohibits major waivers of NPDES permit conditions without notice to the public and a meaningful opportunity for public input. Commissioner Rocque issued sequential EAs without notice to the public and he did not provide an opportunity for public comment. To our knowledge, Rocque's successor, DEP Commissioner Gina McCarthy, has done nothing to bring the Millstone operations into compliance with the law. She has permitted the *status quo* to reign. Connecticut Attorney General Richard S. Blumenthal is complicit in the illegal Millstone activities. Mr. Blumenthal successfully suppressed the truth of Millstone's illegal operations in litigation brought to require Millstone operations to comply with existing laws.

The Coalition attaches hereto the "Emergency Authorization" issued on October 13, 2000 which "legalizes" violations of the expired NPDES permit and which ex-Commissioner Rocque "transferred" to Dominion when it was a paper company without assets. Prior to issuing EAs for Millstone operations, Commissioner Rocque admitted in writing he lacked authority to issue emergency authorizations on an emergency basis for unlimited durations. The EA attached hereto has been in effect on an emergency basis since 2000 premised on a "finding" that it was required to avert "an imminent threat to health or safety." The SEIS makes no reference to this EA. (MPS-82-3)

Comment: *Indeed,* Dominion is currently seeking permission from CTDEP to add **new chemicals** to the "mixing zone" and continue the routine discharge of others. Nowhere in the SEIS is it stated that the NRC staff reviewed Dominion's application for renewal of the NPDES permit. Nowhere are these facts assessed in the SEIS. (MPS-82-10)

Comment: In April 2001, Connecticut's Commissioner of Environmental Protection, Arthur J. Rocque, Jr., "transferred"" [sic] an expired NPDES (National Pollution Discharge Elimination System) permit (it had expired four years earlier) and "emergency authorizations" (which he admitted in writing he lacked legal authority to issue) to "Dominion Nuclear Connecticut, Inc.," at that time a paper company with a post office box in Niantic but no assets. Dominion has been operating under the authority of the expired permit for four years and DEP has not renewed the permit in the intervening time. (MPS-82-23)

Comment: The Coalition hereby places Dominion Nuclear Connecticut, Inc. and Dominion Generation and their related Dominion corporate entities (collectively, "Dominion") on notice pursuant to section 505(b) of the CWA, 33 U.S.C. section 1365(b), that it believes that Dominion has violated and continues to violate "an effluent standard or limitation" under section 505(a)(1)(A) of the CWA, 33 U.S.C. Section 1365(a)(1)(A), by failing to comply with National Pollution [sic] Discharge Elimination System ("NPDES") permit number CT0003253, issued pursuant to section 402(b) of the CWA, 33 U.S.C. Section 1342(b) by the Connecticut Department of Environmental Protection ("DEP") pursuant to authority delegated to it. (MPS-83-1)

Comment: Based on records maintained by the DEP, the Coalition believes that Dominion has discharged and will continue to discharge pollutants into the Long Island Sound in violation of effluent standards or limitations of the NPDES permit issued on December 15, 1992. (MPS-83-2)

Response: *The comments discuss NPDES permit status. As discussed in Section 4.1.1 of the SEIS, CTDEP is responsible for the review and issuance of NPDES permits in Connecticut. The NRC does not have regulatory authority over these permits or the permitting process. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.*

Comment: And the fact is that Millstone uses massive amounts of water, which you guys did mention, to coolant systems. And chemicals must be used to keep its water system functioning. (MPS-18-7)

Response: *The comments are related to water quality and water use conflict impacts. Water quality and CTDEP oversight of discharges are discussed in Sections 2.2.3 and 4.1 of this SEIS. CTDEP has regulatory authority over NPDES permits in Connecticut. However, the permit was reviewed as part of the preparation of the SEIS. The NPDES permit identifies discharge requirements and chemicals and other effluent attributes that are regulated under the permit and requires testing of discharges for biological toxicity. There is no evidence to suggest that Millstone's discharges of chemical and radioactive effluents are adversely affecting Long Island Sound. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.*

Comment: Section 2.1.3 Cooling and Auxiliary Water Systems Page 2-7, Line 9 Draft GEIS Supplement 22 Statement - ...cuts excavated from the bedrock at the eastern end of the quarry into Long Island Sound. Dominion Comment - "eastern" should be changed to "southern," such that the line reads:"...cuts excavated from the bedrock at the southern end of the quarry into Long Island Sound." (MPS-47-2)

Comment: Section 2.1.3 Cooling and Auxiliary Water Systems Page 2-7, Lines 29-32 Draft GEIS Supplement 22 Statement - Service water is withdrawn and diverted from the system before the water enters the condensers. This water is used in a variety of applications, including component cooling (e.g., pump bearings and spent fuel pool water) and fire protection. A maximum of 2.3 m^3/s (36,000 gpm) of service water is withdrawn. Dominion Comment - The configuration of the service water system is somewhat different than that stated, and the stated pump capacity is that only for the three pumps at Unit 2. During normal operation, two pumps at each unit are operating, for a total of 3.4 m^3/s (54,000 gpm). Also, service water issued as backup for several other systems, but not for fire protection. This paragraph should be changed to read: "Service water is also withdrawn inside the intake structures. This water is used in a variety of applications, including component cooling (e.g., pump bearings and spent fuel pool water) and as an emergency backup supply for some systems. During normal operation, approximately 3.4 m^3/s (54,000 gpm) of service water is withdrawn for both units." (MPS-47-3)

Comment: Section 2.2.2 Water Use Page 2-17, Line 2 Draft GEIS Supplement 22 Statement - Additional minor amounts of ocean water are used for fire protection and other systems. Dominion Comment - Although ocean water can be used as backup for some systems, it is not used in the fire protection system. The sentence should be modified as follows: "Additional minor amounts of ocean water may be used as emergency backup for other systems." (MPS-47-10)

Comment: Section 2.2.2 Water Use Page 2-17, Lines 6-7 Draft GEIS Supplement 22 Statement - Dye tracer and modeling studies estimate that 20 percent of the Niantic River discharge goes through the plant. Dominion Comment - These studies determined flow characteristics during three-unit operation. It is estimated that current two-unit operation results in approximately 15 percent of the Niantic River discharge going through the plant. The sentence should be changed to: "Dye tracer studies estimated that 20 percent of the Niantic River discharge went through the plants during three-unit operation. It is estimated that current two-unit operation results in approximately 15 percent of Niantic River discharge going through the plants." (MPS-47-11)

Comment: Section 2.2.3 Water Quality Page 2-17, Line 36 Draft GEIS Supplement 22 Statement - The NPDES permit, which is renewed every five years, expired in 1997. Dominion Comment - Change "expired in 1997" to "was set to expire in 1997 but remains in effect because a timely renewal application was filed with the CTDEP" so sentence reads: "The NPDES permit, which is renewed every five years, was set to expire in 1997 but remains in effect because a timely renewal application was filed with the CTDEP." (MPS-47-12)

Comment: Section 2.2.3 Water Quality Page 2-18, Lines 7-8 Draft GEIS Supplement 22 Statement - Recent monitoring results show that the discharge quality occasionally exceeds permit limits. Dominion Comment - It is suggested that the sentence be changed by adding "There have been occasional instances when" before "monitoring results," substituting "have been above" for "show that the discharge quality occasionally exceeds" and adding "These instances have been properly reported in Millstone's monthly discharge monitoring reports to the CTDEP" so the sentence reads: "There have been occasional instances when monitoring results have been above permit limits (e.g., total suspended solids). These instances have been properly reported in Millstone's monthly discharge monitoring reports to the CTDEP." (MPS-47-13)

Comment: Section 2.2.3 Water Quality Page 2-18, Line 24 Draft GEIS Supplement 22 Statement - ...may be present for no more than two hours in any one day. Dominion Comment - After "two hours," insert "per unit," so the sentence reads:"...may be present for no more than two hours per unit in any one day." (MPS-47-14)

Comment: Section 2.2.5.1 General Water Body Characteristics Page 2-22, Lines 12-15 Draft GEIS Supplement 22 Statement - Millstone Point lies on the western shore of Long Island Sound, near the mouth of the sound. This area of Long Island Sound experiences a salinity of approximately 23 parts per thousand. Salinity is influenced by the presence of three major rivers: the Thames, the Housatonic, and the Connecticut. These rivers flow into the Sound in the vicinity of the site. Dominion Comment - It is suggested that "western shore" be changed to "eastern end," that "23" be changed to "26-30," and that "These" be changed to "The Thames and Connecticut," so the sentence reads: "Millstone Point lies on the eastern end of Long Island Sound, near the mouth of the sound. This area of Long Island Sound experiences a salinity of approximately 26-30 parts per thousand. Salinity is influenced by the presence of three major rivers: the Thames, the Housatonic, and the Connecticut. The Thames and Connecticut rivers flow into the Sound in the vicinity of the site." (MPS-47-18)

Response: *The comments by Dominion concerning water resource issues were reviewed by the NRC staff, and the proposed changes were found acceptable. Sections 2.1.3, 2.2.2, 2.2.3,and 2.2.5.1of the SEIS have been revised to include the suggested changes.*

5. Comments Concerning Aquatic Resources

Comment: Now, let me tell you something. Winter flounder are running strong in our neck of the woods. They're running strong. You do the math. We've got winter flounder in Poconac Bay. We've got winter flounder off the tip of Montock. It's running strong, and it's running strong because the New York State Department of Environmental Conservation has set regulations and limits in regard to how they're caught, protecting their habitat.

And I'm sure the EPA or their environmental organization over here has done the same -- protected the habitat, protected the limits. Therefore, if they're not flourishing in or about the bottom feeding grounds of Millstone, you're going to have to draw your own conclusions. You've done it here in this environmental impact statement. I'd just like to challenge that. (MPS-8-1)

Response: *The comment provides no additional information. Local population trends for winter flounder are discussed in Section 2.2.5.5. There were no changes made to the text of the SEIS because of this comment.*

Comment: I have only a few minor comments on pages 2-25 and 2-26 reference is made to the Gulf of Maine stock - sure you meant southern New England. (MPS-29-2)

Comment: pg 2-26 line 8 "The stock is at low biomass level and is considered to be OVER exploited" (NOAA 1998). (MPS-29-3)

Comment: pg 2-25 Commercial havrest [sic] is generally accomplished with trawl and seines". I'd scratch seines for our area. Virtually all landings are by trawl. (MPS-29-4)

Comment: Section 2.2.5 Aquatic Resources Page 2-20, Lines 28-29 Draft GEIS Supplement 22 Statement - Millstone is located at Millstone Point, a small peninsula of land situated on the west shore of Long Island Sound near Waterford, Connecticut. Dominion Comment - Change "west" to "north," and change "near" to "in," so the sentence reads: "Millstone is located at Millstone Point, a small peninsula of land situated on the north shore of Long Island Sound in Waterford, Connecticut." (MPS-47-16)

Comment: Section 2.2.5 Aquatic Resources Page 2-20, Lines 38-39, and Page 2-21, Line 4. Draft GEIS Supplement 22 Statement - ...about 20 percent of the water discharged from the station from the Niantic River could be passed through the Millstone cooling water system under three-unit operation... Dominion Comment - Delete "from the station," and add "and about 15 percent under two-unit operation" to the end of the sentence, so the sentence reads: "...about 20 percent of the water discharged from the Niantic River could be passed through the Millstone cooling water system under three-unit operation, and about 15 percent under two-unit operation..." (MPS-47-17)

Comment: Section 2.2.5.5 Population Trends Associated with Important Fish and Shellfish Species Page 2-24, Line 41Draft GEIS Supplement 22 Statement - ...and the northern Atlantic cost of the U.S. Dominion Comment - Change "cost" to "coast." (MPS-47-19)

Comment: Section 2.2.5.5 Population Trends Associated with Important Fish and Shellfish Species Page 2-25, Line 28 Draft GEIS Supplement 22 Statement - Individual females can produce up to 500,000 eggs. Dominion Comment - It is suggested that the sentence be changed to read: "Individual females can produce up to 2,500,000 eggs, but 500,000 eggs is an approximate average." (MPS-47-20)

Comment: Section 2.2.5.5 Population Trends Associated with Important Fish and Shellfish Species Page 2-25, Line 36 and Page 2-26, Figure 2-6. Draft GEIS Supplement 22 Statement - ...reporting years (Figure 2-6) (NOAA 1998; MacLeod 2003; National Marine Fisheries Service... Dominion Comment - It is suggested that "Gottschall et al. 2003" be added to the reference list for Figure 2-6 online 36, and in the figure itself. Gotschall et al. is the citation for the CTDEP Long Island Sound Trawl Survey. (MPS-47-21)

Comment: Section 2.2.5.5 Population Trends Associated with Important Fish and Shellfish Species Page 2-26, Lines 4-8 Draft GEIS Supplement 22 Statement - According to NOAA, "The continuing low levels of landings, catch per unit effort indices, and survey indices suggest that winter flounder abundance in the Gulf of Maine has been reduced substantially. Future improvements in the condition of the stock will depend on decreases in exploitation in both the recreational and commercial fisheries, and on improved recruitment. The stock is at a low biomass level and is considered to be exploited) (NOAA 1998). Dominion Comment - It is suggested that the following information regarding the Southern New England stock be added to this paragraph, or as an additional paragraph: "With regard to current winter flounder stock abundance, NEFSC (2003) stated that the Southern New England/Mid-Atlantic winter flounder stock complex has been overfished and overfishing is continuing to occur. The current assessment provided a much more pessimistic evaluation of stock status than the previous assessment made in 1998. Recruitment to the winter flounder stock has been below average since 1989, and indications are that the 2001 year-class is the smallest in 22 years. "The reference for this statement is: NEFSC (Northeast Fisheries Science Center). 2003. B1. Southern New England/Mid-Atlantic (SNE/MA) winter flounder. Pages 139-220 in Report of the 36th northeast regional stock assessment workshop (SAW): stock assessment review committee (SARC) consensus summary of assessments. NOAA/National Marine Fisheries Service, Woods Hole, MA. Accessed via: http://www.nefsc.noaa.gov/nefsc/publications/crd/crd0306 (MPS-47-22)

Comment: Section 2.2.5.5 Population Trends Associated with Important Fish and Shellfish Species Page 2-28, Lines 15-16 Draft GEIS Supplement 22 Statement - ...with commercial harvests over the past seven years for the Atlantis seaboard ranging from approximately 259 to over 300 MT (286 to 331 tons)... Dominion Comment - Change "Atlantis" to "Atlantic." Also, all of the numbers in this sentence should be followed by "x 10^3." (MPS-47-23)

Comment: Section 2.2.5.5 Population Trends Associated with Important Fish and Shellfish Species Page 2-28, Line 25 Draft GEIS Supplement 22 Statement - The silverside (*Menidia menidia,* family *Atherinidae*) is a small... Dominion Comment - Two different species of silverside are found in the area. It is suggested that the sentence be changed to: "The silversides (*Menidia menidia/Menidia beryllina,* family *Atherinidae*) are small..." (MPS-47-24)

Comment: Section 2.2.5.5 Population Trends Associated with Important Fish and Shellfish Species Page 2-28, Line 32 Draft GEIS Supplement 22 Statement - Regional abundance data are not available. Dominion Comment - Dominion notes that Gotschall et al (2003) observed similar fluctuations without trend throughout Long Island Sound. (MPS-47-25)

Comment: Section 2.2.5.6 Other Important Aquatic Resources Page 2-31, Line 8 Draft GEIS Supplement 22 Statement - ...barnacles, the algae *Fucus* spp., the red alga *Chondrus* spp., and... Dominion Comment - It is suggested that this sentence include *Ascophyllum nodosum,* and that it read: "...barnacles, the brown algae *Fucus* spp. and *Ascophyllum nodosum,* the red alga *Chondruscrispus,* and... (MPS-47-26)

Comment: Section 2.2.5.6 Other Important Aquatic Resources Page 2-31, Line 22 Draft GEIS Supplement 22 Statement - ...and the bivalve mollusc *Nuculana annulata* ... Dominion Comment - Change "*Nuculana*" to "*Nucula.*" (MPS-47-27)

Comment: Section 2.2.5.7 Threatened or Endangered Aquatic Species Page 2-33, Line 9 Draft GEIS Supplement 22 Statement - Adult-sized (10 cm [6 or more in.]) sturgeon are occasionally seen... Dominion Comment - Dominion believes that the intent was to characterize adult-sized sturgeon as 6 feet long, rather than 6 inches. (MPS-47-28)

Comment: Section 2.3 References. Dominion Comment - It is suggested that the following new references be added to this list, as discussed in comments above: "Gottschall, K.F., D.J. Pacileo, and D.R. Molnar. 2003. Job 2: Marine finfish survey. Part I: Long Island Sound trawl survey and Part II: estuarine seine survey. Pages 41-149 in: A study of marine recreational fisheries in Connecticut. CT Dept. of Envir. Prot., Bureau of Natural Resources, Fisheries Division." and "NEFSC (Northeast Fisheries Science Center). 2003. B1. Southern New England/Mid-Atlantic (SNE/MA) winter flounder. Pages 139-220 in Report of the 36th northeast regional stock assessment workshop (SAW): stock assessment review committee (SARC) consensus summary of assessments. NOAA/National Marine Fisheries Service, Woods Hole, MA. Accessed via: http://www.nefsc.noaa.gov/nefsc/publications/crd/crd0306" (MPS-47-38)

Comment: Section 4.1 Cooling System Page 4-7, lines 38-39 Draft GEIS Supplement 22 Statement - The barrier prevents fish from entering the quarry. Since installation of the fish barriers, the licensee has not observed any fish kills related to the station discharge. Dominion

Comment - As discussed in section 4.1.3, page 4-28, lines 26-27, temperatures within the quarry occasionally exceed lethal temperature thresholds for some species. Some periodic, smaller-scale fish kills have occurred due to thermal stress for fish that entered the quarry as eggs/larvae, as juveniles, or during barrier maintenance activities. None of these occurrences have been of a magnitude that resulted in an impact to source populations, and they have been confined to the quarry. The sentences should be modified as follows: "The barrier is designed to prevent fish from swimming into the quarry. Since installation of the fish barriers, the licensee has not observed any gas bubble disease-related fish kills related to the station discharge." (MPS-47-39)

Comment: Section 4.1.1 Entrainment of Fish and Shellfish in Early Life Stages Page 4-10, lines 17-19 Draft GEIS Supplement 22 Statement - Licensees are required to demonstrate compliance with the Phase II performance standards at the time of renewal of their NPDES permit. Dominion Comment - "are" should be changed to "will be," and "at the time of renewal of their NPDES permit" should be changed to "in accordance with the provisions of the new rule" so the sentence reads as follows: "Licensees will be required to demonstrate compliance with the Phase II performance standards in accordance with the provisions of the new rule." (MPS-47-40)

Comment: Section 4.1.1 Entrainment of Fish and Shellfish in Early Life Stages Page 4-10, Lines 19-21 Draft GEIS Supplement 22 Statement - Licensees may be required as part of the NPDES renewal to alter the intake structure, redesign the cooling system, modify station operation, or take other mitigative measures as a result of this regulation. Dominion Comment - Delete the words "as part of the NPDES renewal" so the sentence reads as follows: "Licensees may be required to alter the intake structure, redesign the cooling system, modify station operation or take other mitigative measures as a result of this regulation." (MPS-47-41)

Comment: Section 4.1.1 Entrainment of Fish and Shellfish in Early Life Stages Page 4-16, Line 1 Draft GEIS Supplement 22 Statement - *...nonentrained, late stage larvae from reaching reproductive maturity.* Dominion Comment - It is suggested that "and subsequent juveniles" be inserted after larvae, so the sentence reads: "...nonentrained, late stage larvae and subsequent juveniles from reaching reproductive maturity." (MPS-47-44)

Comment: Section 4.1.1 Entrainment of Fish and Shellfish in Early Life Stages Page 4-18, line 17 Draft GEIS Supplement 22 Statement - ... cooling water entrained through the cooling system, the number of eggs entrained,... Dominion Comment - It is suggested that "eggs" be changed to "larvae." (MPS-47-45)

Comment: Section 4.1.2 Impingement of Fish and Shellfish Page 4-22, lines 8-10 Draft GEIS Supplement 22 Statement - Licensees are required to demonstrate compliance with the

Phase II performance standards at the time of renewal of their NPDES permit. Dominion Comment - "are" should be changed to "will be," and "at the time of renewal of their NPDES permit" should be changed to "in accordance with the provisions of the new rule" so the sentence reads as follows: "Licensees will be required to demonstrate compliance with the Phase II performance standards in accordance with the provisions of the new rule." (MPS-47-46)

Comment: Section 4.1.2 Impingement of Fish and Shellfish Page 4-22, lines 10-12 Draft GEIS Supplement 22 Statement - Licensees may be required as part of the NPDES renewal to alter the intake structure, redesign the cooling system, modify station operation, or take other mitigative measures as a result of this regulation. Dominion Comment - Delete the words "as part of the NPDES renewal" so the sentence reads as follows: "Licensees may be required to alter the intake structure, redesign the cooling system, modify station operation or make other mitigative measures as a result of this regulation." (MPS-47-47)

Comment: Section 4.1.2.1 Impingement Monitoring Page 4-24, Table 4-6. Dominion Comment - Dominion believes that the correct reference for this table is Jacobson et al (1998). See the comment below for Section 4.10 for the complete reference. Also, on line 18, the species name for the rock crab is *irroratus.* (MPS-47-48)

Comment: Section 4.1.3 Heat Shock Page 4-29, Lines 9-15. Dominion Comment - Dominion offers the following minor edits: Line 9, change *"concorta" to "contorta."* Line 10, change *"gragile"* to *'fragile,"* and change *"Saragassum gilipendula"* to *"Sargassum filipendula."* Line 13, change "abundance" to "nodal growth." Line 15, change "abundance" to "growth." (MPS-47-49)

Comment: Section 4.10 References Page 4-62. Dominion Comment - Add the following reference, as discussed above: "Jacobson, P.M., E. Lorda, D.J. Danila, J.D. Miller, C.A. Tomichek, and R.A. Sher. 1998. Studies of cooling water intake effects at two large coastal nuclear power stations in New England. In Proceedings of a workshop on Clean Water Act Section 316(b) Technical Issues held at the Coolfont Conference Center, Berkeley Springs, WV, September 22-23, 1998. Electric Power Research Institute, Palo Alto, CA EPRI Technical Report." (MPS-47-52)

Comment: Pg. 2-1. The DSEIS identifies the years when construction began for each of Millstone's three units, but does not mention when the units came on line for commercial production of electricity. These dates, as well as dates when each unit was offline for extended periods, would be helpful in reviewing fish impingement and entrainment data, and should be included in the FSEIS. (MPS-50-1)

Response: *The comments of Dave Simpson of CTDEP, Dominion, and EPA's Region I office regarding aquatic resources were reviewed by the NRC staff and the proposed changes were accepted. Sections 2.0, 2.2.3, 2.2.5, 4.1, 4.10 of the SEIS were modified to include the proposed changes.*

Comment: Pg. 2-7. Intake velocity is estimated to be about 0.2 meters per second in front of the Unit 2 structure. The DSEIS does not state at what distance from the intake screen the velocity was measured. Intake velocity should be presented in feet per second and should be estimated as through-screen velocity, not in front of the screen, which estimates approach velocity. Additionally, no intake velocity data are provided for Unit 3. This information is important for assessing the potential of the intake structure to impinge organisms, and should be provided in the FSEIS. (MPS-50-2)

Comment: Pg. 2-7. The DSEIS identifies some features of the intake structure (e.g., traveling screens, fish return trough), but additional information is heeded to assess the adequacy of the system for returning fish and other organisms in good condition, as well as the potential to re-impinge organisms that have been discharged from the fish return troughs. We recommend that the FSEIS include information on the water pressure(s) of the spray wash system used to remove fish and debris from the traveling screens, the frequency at which the traveling screens are rotated, a spatial-view diagram that includes the location of the intake structures and fish return troughs of each unit, and any other information pertaining to system design or operation that may affect the impingement of organisms and the likely condition of those that are impinged. (MPS-50-3)

Response: *The comments by EPA's Region I office requested additional information regarding the water intake structures and their operation. The staff has revised the text in Section 2.1.3 of the SEIS to include the additional available information.*

Comment: My second point is I object to the risk assessment for winter flounder as moderate. If I understand you correctly, you were saying that because there are so many other risk factors for the flounder, you can't figure out exactly how important this particular risk is.

I want to say that the risks are cumulative. And when you have a flounder population that is already endangered, any additional risk factor becomes more than moderate. It becomes critical. It becomes larger than large. It could be the last straw. (MPS-25-2)

Response: *Cumulative impacts of continued cooling water system operations are discussed in Section 4.8.1. The staff has determined that the Niantic River winter flounder population is affected by gradual long-term warming of Long Island Sound, overfishing, development, predation, and operations of the Millstone cooling water system. There is no agreement regarding the relative contribution of each of these adverse impacts on the Niantic River winter*

flounder. The staff has determined that the cumulative impacts resulting from the operation of the Millstone cooling water system are MODERATE. The comment provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.

Comment: QUESTION: Can the report be modified to make clear that entrainment of 20% of the larvae production does not result in 20% reduction of adult fish because the larvae entrained is outside of the river and this larvae may have little or no impact on the total population of adult Niantic River Winter Flounder?

BACKGROUND: Section 4.1.1 seems to assume that the percentage of Niantic River Winter Flounder larvae that result in adult fish is the same, regardless of whether the larvae is allowed to reach fry stage in the river or whether the larvae is released to Niantic Bay and Long Island Sound. It would seem that larvae released to the bay and sound would experience a more hostile environment, even without Millstone. Therefore, larvae that have left the river would have significantly less impact on the adult population than larvae that remains in the river. Since Millstone can only entrain larvae that has left the river, the effect of entrainment would seem to be greatly exaggerated by simple comparisons as a percentage of larvae production, as discussed on page 4-15 of the report. (MPS-27-1)

Response: *Data are not available to evaluate survival differences for larvae that remain in the Niantic River compared to larvae that enter Niantic Bay and Long Island Sound. Researchers have been unable to explain the relationship between yaer-to-year variation in larval abundance and subsequent year class success. The comment provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.*

Comment: Section 4.1.1 Entrainment of Fish and Shellfish in Early Life Stages Page 4-13, Table 4-4. Dominion Comment - The 2003 Annual Report (Dominion 2004b) contained minor changes to the data in this table. Also, the data columns are each $x10^{6}$. It is suggested that the table be replaced with the following: (MPS-47-42)

Table 4-4. Estimated Number of Anchovies, Winter Flounder, American Sand Lance, Grubby, and Atlantic Menhaden Larvae Entrained Each Year from 1976 Through 2003 at Millstone and the Volume of Cooling Water on Which the Entrainment Estimates Were Based (from Dominion [2004b]).

Year	Anchovies		Winter Founder		American Sand Lance[a]		Grubby		Atlantic Menhaden	
	No. entrained ($X10^6$)	Volume (m^3)[b] ($X10^6$)	No. entrained ($X10^6$)	Volume (m^3)[b] ($X10^6$)	No. entrained ($X10^6$)	Volume (m^3)[b] ($X10^6$)	No. entrained ($X10^6$)	Volume (m^3)[b] ($X10^6$)	No. entrained ($X10^6$)	Volume (m^3)[b] ($X10^6$)
1976	381	738	121	629	--	--	--	--	3	796
1977	418	821	29	444	81	954	30	489	2	773
1978	165	912	80	390	176	709	11	554	3	621
1979	805	786	44	343	110	919	20	546	<1	716
1980	877	633	168	562	111	960	32	699	2	643
1981	1452	860	45	373	74	620	42	408	2	711
1982	451	635	164	638	27	932	48	648	14	743
1983	623	691	211	541	30	902	54	628	19	564
1984	169	801	84	508	18	835	38	524	4	557
1985	693	697	80	469	8	712	35	527	44	521
1986	1096	1208	123	1064	4	1577	53	844	5	1217
1987	119	1332	165	1193	30	1712	51	1144	2	893
1988	386	1790	184	1173	74	1291	112	1132	6	791
1989	518	1445	167	889	42	1511	67	857	208	1420
1990	981	1483	133	1174	39	1607	47	998	33	1367
1991	451	899	116	750	7	1278	31	760	56	802
1992	157	1091	492	1076	19	1302	76	1293	51	1220
1993	214	1221	42	1387	46	1801	51	1157	21	1126
1994	507	1033	173	920	58	899	58	843	66	868
1995	171	896	214	1006	90	1532	57	996	86	997
1996	24	138	51	472	18	729	41	467	23	92
1997	17	145	76	173	3	212	28	154	5	135
1998	64	480	84	358	11	440	22	300	33	615
1999	157	1119	146	748	14	860	49	620	124	1337
2000	75	875	333	1003	88	1459	47	754	466	1571
2001	26	1031	377	963	13	1008	178	721	143	908
2002	28	881	119	880	6	760	33	875	1454	1088
2003	--	--	434	1096	19	725	153	890	--	--

(a) Includes data from December of the previous calendar year.
(b) Volume was determined from the condenser and service cooling water flow at Millstone during the season of occurrence for each taxon.

Response: *Table 4-4 was revised to include the data from the table presented by Dominion.*

Comment: Section 4.1.1 Entrainment of Fish and Shellfish in Early Life Stages Page 4-14, Table 4-5. Dominion Comment - The 2003 Annual Report (Dominion 2004b) contained minor changes to the data in this table. It is suggested that the table be replaced with the following: Table 4-5. Estimated Number of Cunner, Tautog, and Anchovy Eggs Entrained Each Year from 1979 through 2002 at Millstone and the Volume of Cooling Water on Which the Entrainment Estimates Were Based (From Dominion [2004b]). (MPS-47-43)

Year	Cunner		Tautog		Anchovies	
	No. Entrained (X106)	Volume (m3) (X10 6)	No. entrained (X10 6)	Volume (ml3) a (X10 6)	No. Entrained (X106)	Volume (m3) a (x106)
1979	1,055	423	445	680	323	383
1980	1,640	677	962	773	87	359
1981	1,535	620	1,353	620	285	583
1982	2,074	755	1,248	719	210	501
1983	1,888	462	1,019	627	411	377
1984	2,089	532	1,302	569	883	453
1985	2,809	737	1,717	774	26	441
1986	2,855	1,795	3,747	1,795	523	772
1987	4,082	1,713	3,575	1,713	31	740
1988	4,294	1,800	2,693	1,800	15	905
1989	4,306	1,436	3,001	1,510	5	632
1990	3,634	1,689	2,100	1,641	27	724
1991	4,116	1,223	1,513	1,214	105	538
1992	2,648	1,509	1,341	1,509	18	648
1993	5,379	1,492	2,048	1,492	228	626
1994	6,099	1,381	1,989	1,381	175	867
1995	5,524	1,198	2,481	1,198	29	737
1996	871	256	312	256	4	114
1997	569	185	105	134	<1	92
1998	577	718	494	709	47	376
1999	1,963	1,222	1,173	1,222	1	339
2000	4,800	1,254	2,149	1,369	<1	849
2001	4,339	1,416	3,015	1,416	8	635
2002	3,340	1,188	2,040	1,188	<1	750

(a) Volume was determined from the condenser cooling-water flow at Millstone during the season of occurrence for each taxon.

Response: *Table 4-5 was revised to include the data from the table presented by Dominion.*

Comment: In Section 4.1.1 entitled "Entrainment of fish and shellfish in Early Lifestages," we could not find data or discussion about shellfish resources. While shellfish larvae may represent a small fraction of the total composition of all larvae entrained, we recommend that the FSEIS include a discussion about species such as lobster, which has suffered significant declines throughout Long Island Sound. Larval lobster are entrained at other coastal plants, and it is likely that there is some loss occurring at Millstone associated with the daily withdrawal of up to 2.1 billion gallons of water. We recommend that the FSEIS address the entrainment of larval lobster, blue crab, and other shellfish of commercial and recreational interest. (MPS-50-4)

Response: *Table 4-4 and the associated text were expanded to include data and discussion about lobster. Data are not available for blue crab or other shellfish.*

Comment: Pg. 4-12. Table 4-3 (Percent Composition of Fish Larvae and Eggs) is unclear on what the significance of the dates is for each column, and why dates for larvae differ from those for eggs. In addition, it is unclear why a 26-year average of percent composition data for larvae is compared to data from one year (2002-03). We believe it would be more useful to provide a graph that depicts how percent composition has changed annually over the past 27 years. We recommend that the graph include, at minimum, bay anchovy, winter flounder, Atlantic menhaden, American sandlance, grubby, tautog, and cunner. (MPS-50-5)

Response: *A footnote was added to Table 4-3 was modified to improve clarity. The graph suggested by SPA's Region I office was not provided because that level of detail was not necessary for an understanding of relative proportion of entrainment losses by species.*

Comment: Pg. 4-13. Table 4-4 presents larvae entrainment data for select species of fish. As presented, this table is not clear as to how many larvae are entrained on an annual basis. While knowing larval concentration (i.e., the number of larvae per volume of water sampled) is important in understanding the seasonal variations in larval abundance for each species, it does not in itself provide a clear sense of the annual loss of larvae from the plant's operation. We recommend that this table be replaced or accompanied by a table in the FSEIS that lists the estimated total larvae for each species entrained annually from 1976 - 2003. While the entrainment numbers may reflect differences in operating schedules from year to year and such considerations should be noted where they exist, of greatest interest is the number of larvae for each species being removed from the system. We recommend that that number be provided in the FSEIS. (MPS-50-6)

Response: *The headers for Table 4-4 were revised to improve clarity.*

Comment: While an understanding of how many eggs and larvae are entrained annually is important, the significance of those numbers varies from species to species based on a number

of variables including species fecundity, age to maturity, estimated annual mortality, recruitment, and status of the local population. Another consideration that we recommend be addressed is whether a species is an important forage source to local predatory species, and what the loss of their eggs and larvae represent in terms of foregone productivity to the local ecosystem. These analyses were likely performed by Millstone, and we recommend that the FSEIS provide additional information on what the loss of eggs and larvae represent in terms of adult equivalents, and the amount of production foregone for forage species. (MPS-50-7)

Comment: Additionally, for species that are exhibiting depressed local stocks, such as winter flounder and cunner, we recommend that information on spawning stock biomass forgone also be provided. The loss of one adult winter flounder could represent the cumulative loss of future egg production for 14 years, or more. (MPS-50-8)

Response: *Text in Section 4.1.1 was modified to include affected species. Analysis was not available that quantified foregone productivity due to Millstone operation for local species and their predators. In fact, for this area, researchers have been unable to establish a relationship between winter flounder larval production and subsequent recruitment.*

Comment: Pg 4-20. The DSEIS concludes that there is no clear evidence of entrainment impact on species other than winter flounder. While other species may not exhibit the same site fidelity for spawning that winter flounder exhibit, data presented in the DSEIS indicate there is a potential cause for concern that additional losses associated with entrainment to already depressed fish stocks, such as bay anchovy and cunner, could impede stock recovery, at least locally. We believe that entrainment impacts to fish populations that are regionally depressed should receive closer scrutiny in the FSEIS. (MPS-50-10)

Comment: The DSEIS notes that populations of sandlance, bay anchovy, and cunner have been depressed for decades. Anchovy populations reached a 27-year low in 2002. On pg. 4-27, the DSEIS states that anchovy declines appear to be reflecting a regional decline in the stock, but on pg. 2-28 it states that population data for anchovy are not available for Long Island Sound or the Mid-Atlantic region, and therefore "...it is not possible to assess whether decreasing abundance of this species near Millstone is a reflection of regional populations". For the FSEIS, we recommend that Millstone's potential impacts to anchovy populations be reassessed and clarified. (MPS-50-11)

Response: *The comments were considered and text in Section 2.2.5.5 and Section 4.1.1 has been revised. The staff believes that the anchovy population shows high levels of regional variation in abundance. Millstone's impact on the regional anchovy population is indeterminate but likely SMALL.*

Comment: While the SEIS reports that "[T]he CTDEP [Division of Marine Fisheries which has been analyzing this issue for nearly a decade] believes that Millstone is having a significant impact due to entrainment of winter flounder larvae," the SEIS relies on NOAA and NMFS reports – which contain no data of the unique conditions at Niantic Bay but are devoted to a broad, regional analysis of fishing stocks - to discredit CTDEP Division of Marine Fisheries, as follows:

Regulatory agencies concerned with the management of winter flounder have concluded that the resource is overfished and overexploited (NOAA 1998; NMFS 2003) and have instituted measures to reduce fishing pressure throughout Long Island Sound and the southern New England-middle-Atlantic region. Thus, there is ample evidence to suggest that fishing pressure is directly contributing to the decline **both local and regional levels** at and may represent the major impact to this resource. The extent to which Dominion contributes to or exacerbates the problem in the Niantic River system is not elucidated by fish population studies reviewed in this SEIS." [Emphasis added.]

As stated, the SEIS does not identify either a NOAA or NFSS study specific to the Niantic River winter flounder nor the recent fishing habits of commercial fishermen in the area; thus, its failure to accord credit to the CTDEP for its insights appears to be result-driven, to obscure and downplay the fact that the Millstone Nuclear Power State has been the primary factor in driving indigenous fishing stocks to collapse. Or, as Rhode Island expert on Niantic winter flounder, Mark Gibson – a witness whose testimony aided Connecticut Superior Court Judge Robert Hale in issuing a temporary restraining order keeping Millstone Unit 2 shut down during the 1999 spawning season to avoid harmful entrainment effects to the fish population – has stated, Millstone is the worst predator of fish in the Northeast. (MPS-82-51)

Response: *Figure 2-6 has been revised to clarify local and regional population trends for winter flounder. Based on review of the data, the staff agrees with NOAA Fisheries that the resource continues to be overfished and that the stock throughout the region is depressed, including the Niantic River population segment. It is unlikely that Millstone is depressing the population segment in the entire Long Island Sound region, or that the Niantic River population segment is not receiving the same fishing pressure that the rest of the Long Island Sound population segment is experiencing, since winter flounder from the Niantic River range throughout southern New England. To further support this thesis, extended shutdowns of Millstone, Units 2 and 3 from 1997 to 1999 did not result in marked increases in year-classes or adult recruitment of winter flounder from the Niantic River.*

The staff does not agree with the unsubstantiated comment that Millstone is the major contributor to the decline of the stock or with the comment about Millstone's impact on Northeast fisheries. Clearly, Millstone does not remove more fish from the environment than commercial fishery.

With respect to the testimony by Mr. Gibson, there was no final resolution of the referenced case on the merits. The NRC evaluated entrainment in Section 4.1.1 of the SEIS. The comment provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.

Comment: The Coalition has reference to Figure 2-6 ("Comparison of Winter Flounder Population Trends in Niantic River and Long Island Sound". This figure illustrates clearly that while the winter flounder fishing stocks in the region are rebounding – perhaps due in part to fishing restrictions that apply throughout the region – the Niantic River winter flounder population continues its collapse.

The facts available to the NRC staff demonstrate that the sole factor which has prevented the Niantic River winter flounder population from enjoying a rebound as has the species elsewhere in the region due to tightened fishing restrictions is the most obvious one: the Millstone Nuclear Power Station.

It is submitted that if the SEIS staff had pondered the ramifications of Figure 2-6 in consultation with the Niantic fishermen who have gone out of business and the fishermen's expert witnesses and CTDEP's marine biologist Victor Crecco, in light of all the facts and circumstances, the NRC staff would have been compelled to categorize the impact to Niantic winter flounder from continued operations of Millstone in a license renewal period to be "major" and devastating and probably irreversible.

The weight of credible evidence is that the operations of the Millstone Nuclear Power Station have driven the winter flounder to virtual extinction, a phenomenon not contemplated in the original Millstone environmental impact statement. Future entrainment during the license renewal period will definitely assure that the once-abundant, commercially important resource will never return. (MPS-82-52)

Response: *The comment states that the "operations of Millstone Nuclear Power Station have driven the winter flounder to virtual extinction." The NRC staff does not agree with the statement. NOAA Fisheries classifies the Southern New England/Mid Atlantic (SNEMA) winter flounder stock complex as overfished, not near extinction. Winter flounder population trends depicted in Figure 2-6 show an overall decline in Niantic River abundance, and also an overall decline in winter flounder in Long Island Sound.*

The apparent increase in winter flounder at regional scales based on earlier data is called into question based on more recent information compiled by the Northeast Fisheries Science Center (NFSC) 2003. The summary conclusions in that study were that "...the SNEMA winter flounder stock complex is overfished and overfishing is occurring." The document adds "The current

assessment provides a much more pessimistic evaluation of stock status than the SARC [Stock Assessment Review Committee] 28 assessment in 1998 (NEFSC 1999). This is mainly due to the retrospective pattern of underestimating F [fishing pressure] and overestimating SSB [standing stock biomass] in the current VPA [virtual population analysis]." Fishery data for Connectucut are included in this publication and confirm the pattern presented in Figure 4-6. Figure 4-6 has been revised for clarity.

Reference: NEFSC (Northeast Fisheries Science Center). 2003. B1. Southern New England/Mid Atlantic (SNE/MA) winter flounder. Pages 139-220 in Report of the 36th Northeast regional stock assessment workshop (SAW@): Stock Assessment Review Committee (SARC) consensus summary of assessments. NOAA/National Marine Fisheries Service, Woods Hole, Maine. Accessed at: http://www.nesfc.noaa.gov/nefsc/publications/crd/crd0306 on April 15, 2005.

Comment: Pg. 4-24. Table 4-6 provides impingement data for Units 1 and 2. Apparently, no data was collected for Unit 3 based on survival studies that indicated high survival rates for demersal species during cool and cold water periods. Pelagic species, including long-finned squid, bay anchovy, and Atlantic silversides, had poor rates of survival year-round. While these studies may provide some sense of the fish return system's effectiveness for demersal species in cool or cold water conditions, it also clearly demonstrates that some species such as bay anchovy and menhaden are not likely to survive impingement. In addition, it does not indicate what the survival rate is during the warm water months of summer and early fall when the newest year class of some species such as winter flounder are likely to be present in the vicinity of the intakes, and vulnerable to impingement. We recommend that Information on survival rates of demersal species during warmer periods be included in the FSEIS. (MPS-50-12)

Response: *The text in Section 4.1.2 was revised to provide additional information on survival rates for impinged species.*

Comment: The DSEIS states (pg. 4-23) that the highest annual impingement of winter flounder for Unit 2 and 3 combined was 2,446 fish, in 1986. However, Table 4-6 indicates that the largest annual impingement of winter flounder was estimated to be 23,554. The table does not mention whether the number reflects impingement rates for Unit 3. The FSEIS should clarify the estimate of total annual impingement for winter flounder and other species listed in Table 4-6 that reflects impingement numbers for all units together. (MPS-50-13)

Response: *Text in Section 4.1 was revised to clarify this apparent discrepancy and provide additional information about impingement monitoring studies.*

Comment: The most recent data for Unit 2 involves sampling collected biweekly from July 2000 to June 2001. It is questionable whether the Unit 2 fish return was in operation during such period. Data for Unit 3 involve samplings collected biweekly from January to December 1993.

These samplings do not suffice in frequency to form a data base to support conclusions about impingement during the 35-year operations of Millstone, nor to provide an adequate basis for extrapolation to the future.

Thus, the SEIS statement is not supported by genuine evidence:

Based on the assessment to date, the staff expects that the measures in place at Millstone Units 2 and 3 (i.e., aquatic organism return systems) provide mitigation for impacts related to impingement, and no new mitigation measures are warranted. (MPS-82-53)

Response: *The commenter is questioning whether adequate data exist to evaluate impingement impacts of Millstone operation. The original 316(b) demonstration and subsequent studies required by the NPDES permitting process have demonstrated the adequacy of the licensee's data to assess impingement. Under new 316(b) Phase II regulations, the licensee will be again required to adequately characterize impingement losses and comply with new performance standards for cooling water intakes. The comment provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.*

Comment: Heat of the sound is one of the factors you people say is one of the causes for the loss of fish, but you don't think the thermal plume with the loss of fish. At the same time, such a closed cooling system would have the effect of virtually eliminating the killing of the indigenous fish species. (MPS-23-9)

Comment: Attributing the collapse of the fishing stocks to elevated water temperatures, the SEIS fails to consider the contribution of Millstone's 24- hour-a-day, seven-day-a-week thermal discharges to the Long Island Sound. (MPS-82-50)

Response: *A comment was made that NRC staff acknowledged the general increase in water temperature in Long Island Sound over the past few years as impacting winter flounder but did not acknowledge the thermal plume resulting from operation of Millstone's cooling water system as having an impact on winter flounder. The gradual warming of Long Island Sound has ecosystem-level impacts, whereas the thermal plume from Millstone is localized. While there may be some direct effects on some fish from the thermal discharge from Millstone, the effects would not affect regional populations because of the limited extent of the thermal plume. The*

comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.

Comment: Pg 4-27. This section of the DSEIS provides a limited discussion of some potential environmental impacts associated with the discharge of heated effluent. The use of the term "heat shock" implies a fairly limited scope of review for a pollutant (i.e., heat) that can affect aquatic organisms and their habitats in many ways. We recommend that the FSEIS's discussion be expanded to address heat's less conspicuous ability to: 1) preclude the use of affected areas by temperature-sensitive species; 2) attract and expose organisms to areas of fi[illegible]elevated temperature during spawning periods; and 3) expose eggs and larvae to water [illegible]temperatures well above levels that are typical under ambient conditions.

While thermal plumes tend to remain near the surface during most of the year, they have been known to become negatively buoyant during the colder winter periods. If this is the case at Millstone, or if the thermal plume affects the entire water column in shallow areas of Niantic Bay, we recommend that the FSEIS address how the plume might affect adult winter flounder entering Niantic Bay in the winter months en route to spawning grounds in the Niantic River. The 8,000 foot thermal mixing zone, in which temperatures are permitted to exceed ambient levels by 4°F, appears to cover most of Niantic Bay. We recommend that the FSEIS provide a spatial-view graphic depicting maximum temperatures of the thermal plume under various tidal conditions and seasons, and a more comprehensive analysis of the potential sub-lethal effects caused by the thermal plume.

The DSEIS contains a preliminary conclusion that potential impacts to fish and shellfish due to heat shock are small, and that no new mitigation measures are warranted (pg. 4-29). As stated above, EPA believes that the FSEIS should provide a broader review to ensure that all of the possible thermal effects associated with Millstone's daily discharge of up to 2.1 billion gallons of heated water are adequately assessed. We recommend that the FSEIS re-evaluate Millstone's thermal impacts, at least for winter flounder, before reaching a final conclusion on this issue. (MPS-50-15)

Comment: The DSEIS (pg. 4-57) identifies fishing mortality, entrainment from Millstone water withdrawals, environmental changes associated with regional increases in water temperature, and predator-prey interactions as the primary stressors contributing to continuing low winter flounder population levels in the Niantic River area. EPA agrees that there are multiple stressors affecting winter flounder, but we believe that other impacts from Millstone besides entrainment may be helping to impede stock recovery, if not contributing to the population decline.

Impacts from impingement on winter flounder and other depressed stocks have an additive effect to entrainment losses, and we recommend that they be discussed in the assessment of

cumulative impacts. In addition, while the thermal plume from Millstone may not be causing acute mortality to winter flounder and other species, non-lethal effects may have a significant effect to the Niantic Bay area. According to the DSEIS, water temperatures in Long Island Sound (LIS) have increased over a 25-year period by 2.8°F/1 .8°F (daily/annual mean). Temperatures in Millstone's mixing zone are permitted to be up to 4.0°F higher than ambient. The DSEIS states that elevated water temperatures in LIS may be a major contributing factor to the flounder's decline, but the report does not address possible effects elevated temperature from Millstone's thermal plume has on Niantic Bay, most of which is contained within the designated thermal mixing zone. If there is information supporting a conclusion that thermal effects are not having any adverse impacts on winter flounder behavior, spawning success, habitat use, young-of-year survival, changes in trophic dynamics or forage opportunities, we recommend that it be included in the FSEIS.

We recommend that the FSEIS provide maps with depictions of the thermal plume on multiple stages of the tide. These maps should include known aquatic resources, such as shellfish beds, fish spawning and nursery habitats and fish migration routes. (MPS-50-16)

Response: *Comments were made by EPA's Region I office that the NRC staff should the expand discussion on thermal-related impacts in Section 4.1.3. Thermal plume barriers to migrating fish, altered distribution of aquatic organisms due to thermal effects, and stimulation of nuisance organisms have been categorized as Category 1 issues for license renewal. A Category 1 issue is one for which a single significance level has been assigned and applies to all plants with a specific cooling system, that additional plant-specific mitigation measures are not likely to be sufficiently beneficial to warrant implementation. Nevertheless, the staff has included additional text and figures in section 4.1.3 to provide additional information on monitoring studies of thermal impacts.*

Comment: The SEIS states:

Millstone has remained in compliance with the NPDES thermal and discharge volume limits at the quarry cut. [SEIS at page 4-28]

Yet, the SEIS report is absent any indicia of an independent basis from which to render such a conclusion.

The SEIS states:

The [NRC] staff also independently reviewed monitoring reports for the cooling-water discharge mixing zone .... the boundary of the mixing zone cannot exceed a radius of 2438 m (8000 ft) from discharge outlet at the quarry cut.

The SEIS report does not identify a single monitoring report by date or otherwise; any conclusions regarding the cooling-water discharge mixing zone are utterly unsubstantiated. (MPS-82-54)

Response: *The comment states that the draft SEIS does not identify a single monitoring report by date or otherwise. This statement is not true. Monitoring reports cited and discussed in Section 4.1.3 include Dominion (2004b) and NUSCO (1987b). The comment provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.*

Comment: The cumulative impact of routine operations to aquatic resources, although recognized as significant for winter flounder (Supplement 22, page 4-56), are not adequately addressed or mitigated by the SEIS. (MPS-52-5)

Response: *Possible mitigation measures to reduce the impacts associated with the Millstone cooling water system are not discussed in the SEIS because such measures fall within the regulatory responsibility of the CTDEP. The comment provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.*

Comment: Pg. 4-21. The DSEIS concludes that impacts to the Niantic River winter flounder population from entrainment is "moderate," though it suggests fishing mortality plays a much more significant role. Other stressors, including rising water temperatures, are also cited as possible contributing factors. According to the DSEIS (pg.1-4), "moderate" is defined as "Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource." From our review of the DSEIS, there seems to be general agreement that the Niantic River winter flounder stock has been destabilized, that multiple stressors are contributing to this condition, and that the entrainment of larvae at Millstone (e.g., 492 million in 1992) is one of the contributing stressors.

The DSEIS concludes that the NRC has no role in mitigating for entrainment impacts since such impacts are regulated under the Clean Water Act. We agree that these impacts are regulated under CTDEP's NPDES permit. However, we believe that under NEPA, the FSEIS needs to fully evaluate and disclose the potential environmental impacts from this operation, and identify possible operational and technology alternatives that could effectively mitigate for the loss of aquatic resources. The DSEIS correctly identifies the unique vulnerabilities associated with the winter flounder's habitat of returning to natal systems to spawn, suggesting that localized impacts could dramatically influence local population dynamics. However, the DSEIS includes only a very limited discussion on mitigation alternatives, and suggests that any reduction in entrainment losses would lessen the impact of the plant on the Niantic River winter flounder population. This assessment does not fully document the plant's impact on the decline of local winter flounder stocks. (MPS-50-9)

Response: *The staff agrees that the SEIS does not fully quantify Millstone's impact on the decline of local winter flounder stocks because data necessary to fully quantify the level of impact are not available. Nevertheless, the staff believes that sufficient information exists to make a qualitative assessment of impact, and the staff has concluded that the impacts of continued operation of the Millstone cooling water system would be MODERATE. Text in Section 4.1.1.2 has been revised to clarify the NRC's position on mitigation.*

Comment: The SEIS does not address the prospect that Millstone will undergo a major refurbishment in the conversion from the once-through to a closed cooling system. This is a major omission in the SEIS. (MPS-82-9)

Comment: The NRC SEIS staff accepted at face value Dominion's self-assessment that it would not conduct "major" refurbishment in the future. Thus, the NRC SEIS staff considered neither "major" or "minor" refurbishments. The NRC SEIS staff's conclusions about the radiological impacts during refurbishment are therefore necessarily flawed. Given the strong likelihood that major refurbishment in the form of a stationwide conversion from once-through cooling to closed cooling systems will be ordered by the Connecticut DEP – to avoid future exposure of pregnant women and others to harmful radioactive and toxic waste effluents in the "mixing zone" and to avoid irreversible impacts to the indigenous Niantic winter flounder – the radiological impacts from such refurbishment should have been fully explored and analyzed in the SEIS. (MPS-82-60)

Comment: Let me move into another area, which is a major oversight in this so-called environmental analysis. And that has to do with discharges, both to the air and the water of pollutants. There is no documentation in this entire environmental impact statement of the chemicals, no identification of the hundreds of chemicals, many of them caustic, carcinogenic agents that are used at the plant routinely and flushed out into the Long Island Sound along with radioactive waste agents.

Why doesn't it say that in this environmental impact statement? It's so simple. It can be stopped. That is an alternative. The way to stop it other than shutting Millstone is to convert it to a closed cooling system. (MPS-23-8)

Response: *Conversion to closed-cycling cooling is not considered refurbishment because it is not a required action that is to prepare the facility to operate during the renewal term. At this time, there is no specific proposal by CTDEP or the licensee to convert the Millstone once-through cooling system to a closed-cycle system. As discussed in Section 4.1 of this SEIS, Dominion and CTDEP are discussing mitigation measures as part of the NPDES permit renewal application. There are several mitigation options being discussed, including the installation of*

cooling towers. CTDEP is responsible for the review and issuance of NPDES permits and implementation of the Clean Water Act in Connecticut. The NRC does not have authority over matters concerning discharge permits or compliance with the CWA. Any mitigation required by the state of Connecticut as a result of the ongoing NPDES permit review would be considered at that time. The comments provide no new and significant information, therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.

Comment: Millstone is responsible for the depletion of native fish species through the operations of its intake structures. All these assaults on the environment would end if (a) Millstone were shut down or (b) if Millstone converted to closed cooling system. This important issue certainly affects Long Island because of the dispersion of toxic and radioactive waste byproducts by tidal and wave action. (MPS-53-4, MPS-57-4, MPS-58-4, MPS-59-4, MPS-68-3, and MPS-70-3)

Comment: The Millstone operation depletes the native fish population due to ineffective intake methods. (MPS-56-3)

Comment: And if a closed cooling system existed, would that not have a positive impact upon the environment? Why isn't one being installed? (MPS-61-2)

Comment: Millstone is responsible for driving the native fisheries stock to near-extinction through the operations of its intake structures. All these assaults on the environment would end if (a) Millstone were shutdown or (b) if Millstone converted to closed cooling system. This important issue certainly affects Long Island because of the dispersion of toxic and radioactive waste byproducts by tidal and wave action. (MPS-66-4)

Comment: The Coalition further represents that some or all of the discharges to the Long Island Sound as listed hereinabove are unnecessary; if the Millstone Nuclear Power Station were to convert from a "once-through" to a "closed" cooling system, some or all of these harmful discharges to the Long Island Sound would be eliminated. (MPS-83-4)

Comment: ... but I still would recommend that Millstone build the cooling towers, especially after reading this report. It would save some of the fish and other wildlife in our area. (MPS-18-8)

Response: *The comments are related to closure of Millstone, mitigation through conversion to closed-cycle cooling, and discharge of chemical and radioactive waste to Long Island Sound. The staff recognizes that there are at least five primary factors that are contributing to the depletion of native fish species in Long Island Sound. These factors are overfishing, entrainment by Millstone, gradual regional increase in water remperature, land use changes affecting water quality in the Niantic River, and predation. The relative contribution of each of these factors can not be quantified at this time. However, during the three-year period*

(1997–1999) of plant shutdown, during which there was no significant water withdrawal from Long Island Sound and no appreciable thermal discharge, there was no corresponding increase in winter flounder abundance. Before requiring any significant mitigation, the staff recommends that the relative contribution of each of these five primary stressors be understood. Finally, there is no evidence to suggest that plant discharges of chemical and radioactive waste are having an adverse effect on the environment. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.

Comment: When you analyzed the loss of fish, winter flounder, in your report, you state that you spoke with the DEP. You don't name anyone from DEP. (MPS-23-10)

Response: *Appendix D contains information about organizations that were contacted during preparation of the draft SEIS. NRC staff consulted with Dave Simpson, Vic Crecco, and Eric Smith at CTDEP. The comment provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.*

Comment: The DSEIS states (pg. 4-27) that the measures in place at Millstone Units 2 and 3 provide mitigation for impacts related to impingement, and no new measures are warranted. This conclusion is a departure from NRC's approach taken for entrainment which is to defer the issue of mitigation to the CTDEP. It is unclear why the DSEIS advises that no further mitigation is warranted for impingement, but for entrainment impacts which the NRC believe are moderate, the question of need for, and alternative ways to accomplish, mitigation is largely deferred. As noted above, we believe that under NEPA, a discussion of appropriate mitigation alternatives should be in the FSEIS. In addition, we recommend that the FSEIS not view entrainment and impingement as mutually exclusive impacts, but instead assess the combined effects of entrainment, impingement, and the thermal plume on species such as winter flounder and anchovy that are vulnerable to two or all of these stressors. (MPS-50-14)

Response: *The staff has revised the text in Sections 4.1.1.2, 4.1.2.3, and 4.1.3 to clarify its position on mitigation. The combined impacts of impingement and thermal effects on winter flounder do not change the staff's conclusion in Section 4.8.1 that the combined impacts would be MODERATE.*

Comment: At the same time, you didn't talk to fishermen. You said that you were concerned that over-fishing was responsible for depletion of the winter flounder. You didn't talk to fishermen. You didn't go back and talk to the expert, Mark Gibson from Long Island, who was able to persuade a judge of the Superior Court of this State to shut down Millstone Unit 2 to spare the winter flounder back in 1998. Why didn't you talk to him?

Why didn't you talk to Victor Crecco at the Department of Environmental Protection? Why was your bias so manifest in your report? (MPS-23-11)

Comment: Astonishingly, the NRC staff does not report any attempt to consult with the fishermen who are targeted in the SEIS for the demise of the Niantic winter flounder population. Had the NRC staff attempted to locate commercial fishermen who fish for Niantic winter flounder near Millstone, it would have learned that the resource has vanished and, with it, the fishermen and a way of life.

Nor, apparently, did the NRC staff make any effort to consult with the experts who have testified in court proceedings to the overwhelming evidence that the suction action of the Millstone intake structures is the predominant cause of the collapse of the Niantic winter flounder population and has been since 1986, when Millstone Unit 3 went online. (MPS-82-46)

Comment: Why did the NRC staff not meet with DEP's Victor Crecco, author of reports debunking Dominion's theorizing about the Millstone impacts on the Niantic winter flounder collapse? (MPS-82-48)

Response: *The comments suggest that the NRC staff showed bias in the selection of people interviewed in the review process. NRC staff reviewed and considered comments submitted by a wide variety of stakeholders, including comments submitted by fishermen at the public meetings held on May 8, 2004. The staff also consulted with experts from CTDEP (including Vic Crecco), NOAA Fisheries, University of Connecticut, USEPA, and the applicant. A report authored by Gibson (see reference below) was reviewed by NRC staff. This report was not cited in the SEIS because its conclusions about the impact of Millstone on the Niantic River winter flounder population segment were based on assumptions about the status of Niantic River winter flounder compared to regional trends. Recent regional stock and recruitment data have not substantiated these assumptions.*

Reference: Gibson, M.R. 1999. Estimation of the Reduction in Recruitment of Winter Flounder in the Niantic River Associated with Operations at Millstone Nuclear Power Station. Unpublished manuscript.

Comment: Although NRC staff spoke with Prof. Crivello of the University of Connecticut, who has studied Millstone entrainment, the staff does not explicitly identify Prof. Crivello as a paid consultant to Millstone's owners and operators each time his name appears in the SEIS.

Instead, you talked to a consultant. You called his work "independent," but the consultant, Mr. Crivello, actually was a consultant paid and hired by the utility. You don't say that in your report. (MPS-82-47)

Response: *Dr. Crivello is an associate professor in the Department of Physiology and Neurobiology, and the Department of Marine Sciences at the University of Connecticut. He has expertise in aquatic biology, aquaculture, aquatic toxicology, marine invertebrate and vertebrate genetics, DNA technology, and the use of polymorphic DNA markers for marine invertebrates and vertebrates in analysis of population structures. Crivello has authored more than 20 articles in peer-reviewed scientific journals. Crivello's work is attributed to Dominion the first time it is referenced in Section 4.1.1 of the Draft SEIS. Text in section 4.1.1 was modified to explicitly identify Crivello as a paid consultant of Dominion.*

Comment: A Connecticut Superior Court judge enjoined the restart of Millstone Unit 2 in 1999 because he was persuaded that the health and stability of the indigenous Niantic winter flounder stocks were endangered by operations of the Millstone intake structures through entrainment and impingement. Fish Unlimited v. Northeast Utilities.

In 2000, two commercial fishermen sued Northeast Utilities for tortiously causing the collapse of the formerly commercially viable Niantic winter flounder fishing stocks; their suit remains pending. (MPS-82-21)

Response: *The comment pertains to civil litigation beyond the purview of the NRC. The NRC evaluated entrainment in Section 4.1.1 of the SEIS. The comment provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.*

Comment: Let alone it's a environmental hazzard to Long Island Sounds living fish and creatures and water quality. Its killing Long Island Sound and the people living near it. (MPS-45-2)

Comment: The threat posed my [sic] Millstone's operation to Long Island's environment and quality of life are larger than the benefits to CT's energy costs. (MPS-60-4)

Comment: The plant has a negative environmental impact on our waterways and wildlife, in addition to the harmful health hazards posed to humans. (MPS-69-3)

Comment: Please use your common sense and protect both the public and the fragile LI Sound environment before you license Millstone to continue for another twenty years. (MPS-55-3)

Response: *The comments relate to Millstone's impact on aquatic resources. The comments are not specific. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.*

Comment: I reviewed the sections of the GEIS pertaining to entrainment and thought you folks did a very nice job, especially summarizing the available information and the debates/points of disagreement on models and analysis. (MPS-29-1)

Response: *The comment relates to the analysis of entrainment from Millstone's operation. The comment provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.*

Comment: The GEIS identifies the issue of scouring caused by discharged cooling water as a Category 1 issue. As a "Category 1" issue, the NRC staff will not review it on a Millstone site-specific basis in the absence of "new and significant information."

Yet, scouring caused by discharged cooling water was identified by a technician in the Millstone Environmental Laboratory as an irreversible environmental impact during a recent public presentation on Dominion's environmental impacts presented at the Three Rivers Community College. (MPS-82-45)

Response: *Scouring impacts are categorized in Section 4.1 of the SEIS. Some scouring has likely occurred in the vicinity of the station outfall in an area that is orders of magnitude smaller than Jordan Cove and Long Island Sound. The impact of scouring is most pronounced upon station startup; over time, an equilibrium is established between flow rate and bottom disturbance. Since Millstone has operated for over 20 years, no significant impact is expected during future operations. The staff characterized these impacts as SMALL in the GEIS. The staff did not identify any significant new information during its preparation of this SEIS. Therefore, the staff concludes that there are no impacts related to this issue beyond those discussed in the GEIS. The comment provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.*

6. Comments Concerning Terrestrial Resources

Comment: Section 2.1.7 Power Transmission System Page 2-15, Line 2 Draft GEIS Supplement 22 Statement All personnel applying herbicides are required to process a valid applicator's license. Dominion Comment - It is suggested that the word "process" be changed to "possess," so that the sentence reads: "All personnel applying herbicides are required to possess a valid applicators license." (MPS-47-9)

Comment: Section 2.2.6.1 Site Terrestrial Resources Page 2-36, line 10 Draft GEIS Supplement 22 Statement - ...173 fledglings have been produced over this period. Dominion Comment - As of the present time, the number of fledglings produced at Millstone stands at 186. (MPS-47-29)

Comment: Section 2.2.6.1 Site Terrestrial Resources Page 2-36, line 14 Draft GEIS Supplement 22 Statement - There are 18 species listed by FWS or the state of Connecticut as being known to occur on the site. Dominion Comment - Dominion believes this sentence refers to the 18 species listed in Table 2-3. Some of those species have been observed on the site or along the transmission lines, and some have not been observed, but may occur. It is suggested that the sentence be changed to: "There are 18 species listed by FWS or the State of Connecticut that have either been observed on the site or have the potential to occur in the area or along transmission lines." (MPS-47-30)

Comment: Section 2.2.6.1 Site Terrestrial Resources Table 2-3 Draft GEIS Supplement 22 Statement - This table lists terrestrial species known to occur or that potentially occur at Millstone or along the transmission lines. Dominion Comment - Dominion notes the following: As of June 2004, the Cooper's hawk is no longer listed by the State of Connecticut. The piping plover is listed as "threatened" by the State of Connecticut. Dominion is unable to find any citation by the State of Connecticut that lists the New England cottontail as either threatened or endangered. The seabeach sandwort is listed by the State of Connecticut as a "special concern" species. (MPS-47-31)

Comment: Section 4.6.2 Terrestrial Species Page 4-52, Lines 33-34 Draft GEIS Supplement 22 Statement - Both the bald eagle (*Haliaeetus leucocephalus*) and the piping plover (*Charadrius melodus*) are known to occasionally use the Millstone site. Dominion Comment - To Dominion's knowledge, the piping plover has not been observed on the Millstone site. Dominion believes the intent may have been to name the roseate tern, which has been observed on the site. It is suggested that the sentence be changed to: "Both the bald eagle (*Haliaeetus leucocephalus*) and the roseate tern (*Sterna dougallii*) are known to occasionally use the Millstone site." (MPS-47-51)

Response: *The NRC staff reviewed these comments by Dominion and accepted them. Sections 2.1.7, 2.2.61, and 4.6.2 of the text of the SEIS were modified.*

7. Comments Concerning Air Quality

Comment: Section 2.2.4 Air Quality Page 2-20, Lines 20-22 Draft GEIS Supplement 22 Statement - Air emissions from these sources are subject to Connecticut General Statutes section 22a-174-33 of the Regulations of Connecticut State Agencies (Connecticut Legislature 2003). Dominion Comment - In addition to section 22a-174-33 (which regulates Title V air permits), air emissions from site sources are subject to other regulations. It is suggested that this sentence read: "Air emissions from these sources are subject to Connecticut General Statutes, various sections of the Regulations of Connecticut State Agencies, Title 22a-174, 'Abatement of Air Pollution,' and various federal regulations." (MPS-47-15)

Response: *The NRC staff reviewed this comment by Dominion and accepted it. Section 2.2.4 was modified.*

8. Comments Concerning Socioeconomics

Comment: The SEIS considers the economic contribution to the community through payment of Dominion's workforce; however, the SEIS does not separate out the economic investment made in maintaining a workforce to monitor Unit 1, a nuclear power plant undergoing decommissioning, and its repository of spent nuclear fuel. Nor does the SEIS consider the prospect of a continuing workforce required to maintain Units 2 and 3 in the event each or both units is/are decommissioned or prematurely shut down before or during the renewal period. (MPS-82-62)

Response: *The comment is related to potential socioeconomic impacts associated with Unit 1 and with decommissioning of Units 2 and 3. Activities associated with Unit 1 are outside the scope of the SEIS analysis. As discussed in Chapter 7 of this SEIS, environmental impacts from the activities associated with the decommissioning of any reactor before or at the end of an initial or renewed license are evaluated in the "Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," NUREG-0586, Supplement 1. The incremental environmental impacts associated with decommissioning activities resulting from continued plant operation during the renewal term are evaluated in the "Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS)," NUREG-1437, Volumes 1 and 2. These impacts have been characterized as SMALL. Chapter 8, section 8.1 of this SEIS evaluates the immediate impacts that occur between plant shutdown and the beginning of decommissioning as part of the No-Action Alternative. The impacts to socioeconomics are characterized as SMALL to MODERATE. The comment provides no new and significant information, therefore, the comment was not evaluated further. There was no revision made to the text of the SEIS.*

Comment: ... we do have some concerns about the fact that there would be a tremendous loss of tax revenues if these plants were to close. (MPS-21-1)

Comment: As far as the town goes, Millstone currently represents about 51 percent of the grand list. And there we're looking at property taxes. So effectively if the plant weren't there, the tax rate would be doubled, projecting forward to 2015. It's about the 34 percent of the grand list. (MPS-21-2)

Response: *The comments are related to socioeconomic impacts (tax increases) if Units 2 and 3 were to close. Chapter 8, section 8.1 of this SEIS evaluates the immediate impacts that occur between plant shutdown and the beginning of decommissioning as part of the No-Action Alternative. The impacts to socioeconomics are characterized as SMALL to MODERATE due*

to loss of jobs and reduction of the tax base. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.

Comment: But you are not -- didn't seem to be addressing the constant flow of waste going to Barnwell and their impacting an African-American community of low income and constantly building up and causing a great deal of trouble and health harm there.

So it seems to me that the environmental impact statement doesn't raise that issue, and I wonder why. (MPS-5-3)

Comment: We don't know what to do with nuclear waste. I think it's unethical to generate hazardous waste in our community and transport it out for disposal.

It's unethical whether the community that is receiving the waste wants it or not, because the community that wants it is bound to be poor. They're in it for the money. They need the money. But what they get is contaminated groundwater and contaminated -- all that that means, all that the contamination of their community means.

And as for Nevada -- the State of Nevada having to receive it, put our foot in that shoe. We wouldn't accept the nuclear waste of another State or, worse, of the nation. (MPS-11-8)

Comment: I did look at this on the environmental impacts and the geographic distribution and having to do with environmental justice. And you claim that, again, you say it's small, the impact of environmental justice on the people that live around Millstone, but what it doesn't look at is the whole picture because in justice, environmental justice, is caused when the low-level waste is shipped to Barnwell, South Carolina and it's environmental justice when the uranium that's used to make the fuel is mined on Native American land and when the waste goes out to the Goshutes in Utah. That's environmental justice. And it does happen. It's not part of this report. (MPS-18-10)

Comment: Environmental Justice issues were incorrectly discarded by not considering that the low-level radioactive wastes are shipped routinely to places such as Barnwell, S. Carolina, an area that has a predominately poor and African-American population. (MPS-28-5)

Comment: It has also come to my attention that nuclear waste is shipped to Barnswell, South Carolina and has a negative health impact on the poor community. This information about the destination and impact of nuclear waste from Waterford should be included in the NRC's environmental impact agenda. (MPS-65-5)

Comment: It appears we have not dealt with the environmental justice issue of shipping nuclear waste to poor communities. (MPS-81-3)

Comment: The SEIS does not address the environmental justice issues involved in the transportation and storage of nuclear waste generate by the Millstone Nuclear Power Station, either during its 35 years of operations or in the future. Transportation through poor urban areas and storage of Millstone's nuclear waste in poor rural communities both implicate environmental justice concerns; neither aspect was addressed in the SEIS. (MPS-82-64)

Response: *The comments are related to impacts of transportation of spent fuel and waste as it may relate to minority and low-income populations. Environmental justice is a Federal policy under which each Federal agency identifies and addresses, as appropriate, disproportionately high and adverse human health or environmental impacts of its programs, policies, and activities on minority and low-income populations.*

The impacts of shipping spent fuel and waste were evaluated in the GEIS and the staff determined these impacts would be SMALL. In addition, impacts from transportation of spent fuel and waste from Millstone during the license renewal period were evaluated in the GEIS and the staff determined those impacts would be SMALL. Both of these issues are reviewed in Chapter 6 of this SEIS. The staff did not identify any new and significant information during preparation of this SEIS. Therefore, the staff concluded that there are no impacts of spent fuel and waste transportation associated with license renewal beyond those discussed in the GEIS. Specific impact evaluation of spent fuel and waste transportation on the public and on environmental justice populations are outside the scope of this SEIS. Rather, specific spent fuel and waste transportation impacts would be analyzed when a license application for transportation of spent fuel and/or nuclear waste is submitted to NRC. The comments provide no new and significant information, and therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.

Comment: Section 2.1.1 External Appearance and Setting, Page 2-2, Line 18 Draft GEIS Supplement 22 Statement - ... All development at Millstone is situated south of this mostly below-grade rail line. Dominion Comment - After the word "Millstone," insert "except the training facility," such that the sentence reads: 'All development at Millstone, except the training facility, is situated south of this mostly below-grade rail line." (MPS-47-1)

Comment: Section 2.1.6 Plant Operation and Maintenance Page 2-12, line 37 Draft GEIS Supplement 22 Statement Dominion assumes that an additional 60 employees will be needed... Dominion Comment - Sentence should be changed to: "Dominion assumes that no more than 5 additional employees will be needed..." (MPS-47-8)

Comment: Section 2.2.8.1 Housing Page 2-44, line 1 Draft GEIS Supplement 22 Statement... *while another 200 live in Niantic and East Lime.* Dominion Comment - Change "Lime" to "Lyme." (MPS-47-32)

Comment: Section 2.2.8.2 Public Services Page 2-47, Lines 10-12 Draft GEIS Supplement 22 Statement - A new water supply line was constructed in 2000 to supply Millstone, and this line replaced the use of two shallow low-yield wells that had been used to irrigate ball fields and supply concession stands on the Millstone site licensed to Waterford. Dominion Comment - It is suggested that this paragraph be replaced with the following clarification: "A new water supply line was constructed in 2000 to supply a concession stand at the ball fields licensed by Millstone to Waterford. The stand had been supplied by a shallow low-yield well, which continues to be used to irrigate the ball fields on a seasonal basis." (MPS-47-33)

Comment: Section 2.2.8.5 Demography Page 2-55, Line 30 Draft GEIS Supplement 22 Statement - *Source: Dominion 20004a.* Dominion Comment - Delete a zero in the date of the citation. (MPS-47-34)

Comment: Section 2.2.8.5 Demography Page 2-56, Line 35 Draft GEIS Supplement 22 Statement - ... after September 11, 2000... Dominion Comment - Change "2000" to "2001." (MPS-47-35)

Comment: Section 2.2.9.1 Cultural Background Page 2-60, Line 25 Draft GEIS Supplement 22 Statement - ....Park overlooking the Thames River about 8km (5 mi) northwest of Millstone. Dominion Comment - Change "northwest" to "northeast." (MPS-47-36)

Comment: Section 2.2.9.1 Cultural Background Page 2-63, Line 16 Draft GEIS Supplement 22 Statement - Actual power generation began in 1975. Dominion Comment - Unit 1, which is not the subject of this report, began generating power in 1970. It is suggested that "at Unit 2" be inserted so sentence reads as follows: "Actual power generation at Unit 2 began in 1975." (MPS-47-37)

Comment: Section 4.4.2 Public Services: Public Utility Impacts During Operations Page 4-40, Lines 17-18 Draft GEIS Supplement 22 Statement - Millstone's 2000 to 2001 potable water usage averaged 1.257 X 10^6 L per day (3.320 X 10^6 gpd). Dominion Comment - Change "3.320 X 10^6 gpd" to "3.320 X 10^5 gpd." (MPS-47-50)

Comment: ... the population within a 10-mile radius of Millstone increases seasonally as a result of an influx of approximately 10,500 summer residents. The SEIS contains no figures of the seasonal influx of visitors to the eastern end of Long Island although it is within the 50-mile radius of Millstone. (MPS-82-14)

Response: *The comments concern socioeconomic issues. The NRC staff reviewed and accepted the suggestions for revisions to the SEIS. Sections 2.1.1, 2.1.6, 2.2.8.1, 2.2.8.5, and 4.4.2 have been revised to incorporate these comments.*

9. Comments Concerning Human Health

Radiation Exposure and Cancer

Comment: The Tumor Registry says that you all have the highest cancer rate in -- is in New London County. And within that, the top -- the six towns around it, around Millstone, have the highest of 12 different cancers. (MPS-1-3)

Comment: I was interested to hear the comment that this environmental impact statement draft addresses the issue of radiological impacts and cancer in the community. I have reviewed every page of this document, and I have found nothing here that seriously addresses or, in fact, even addresses the link that the scientific community has established between radiological emissions from nuclear power plants such as Millstone and cancer.

In fact, what I have seen in this report is an outright statement that no link has been established between the radiological emissions from Millstone, which we know are among the very highest in the entire country, and the high incidence of cancer which has been identified in this area. (MPS-2-1)

Comment: ... there was a document presented which was the affidavit of Dr. Ernest Sternglass, which went through chronologically, historically, the scientific links between radiological emissions from nuclear power plants such as Millstone, and, in fact, including Millstone particularly, and cancer, including very recent -- a very recent report appearing in The Journal of the American Medical Association linking dental X-ray exposure to pregnant women to early childbirth, premature labor, and potentially significant problems later. (MPS-2-2)

Comment: We presented to those proceedings an affidavit from Cynthia Besade – a resident of Waterford for many years, and a person knowledgeable as to aspects concerning former workers at the Millstone power plant, including her father who was one of seven pipefitters who all died of similar diseases, cancers, before their time.

Her affidavit also detailed examples of children dying of leukemia and other diseases in the community, friends, mothers of... (MPS-2-5)

Comment: There is a summary of draft report findings in the back of this room. I wrote down five. Impact to human health -- impacts to human health are of small significance. Impact to air

quality are of small significance. Impact of radioactive and non-radioactive waste management are of small significance. Impact of postulated accidents are of small significance.

Current measures to mitigate the environmental impacts of plant operations are adequate, and no additional mitigation measures are warranted. These are lies. These are willful, deceptive lies. (MPS-2-6)

Comment: There's been a complete disregard of all of the information that has been submitted about health effects.

When the NRC can say, "Impact to human health -- impacts to human health are of small significance," do they mean small people, just to children, so it doesn't matter? Or what do they mean by that? (MPS-2-7)

Comment: Before Nancy Burton was making the point that information from scientists in the radiation and public health project -- that was available at a -- a related hearing about this issue -- was not considered in your draft. (MPS-3-1)

Comment: Mr. Mangano's recent information is that local health declines when Millstone opens improves after closing, in which he reports that the cancer instance rate in New London County was 8 percent below the State in the '50s and '60s before Millstone opened.

After Millstone began operating in 1970, this rate has risen steadily until now it has reached a level 6 percent above the State rate. So that's going from 8 percent below to 6 percent above. So he -- Mangano says that of the over 1,300 New London residents diagnosed with cancer each year, nearly 200 can be considered in excess of what would be expected if earlier levels had been maintained. (MPS-3-2)

Comment: Mangano also reports that about -- infant mortality deaths of children one year and younger. In 1994 and '95 when Millstone was operating, there were 136 such deaths, unfortunately. When Millstone closed -- was closed, pretty much for all of '96 and '97, that rate dropped, and then the number dropped to 105. (MPS-3-3)

Comment: This makes it all very, very plain, the way he lays it out. '94/'95, Millstone was operating at 80 percent capacity, and there were 136 deaths, the rate of 7.41. '96/'97, it was only operating at 10 percent. The deaths dropped to 105, which is -- the rate dropped to 6.07, which is over an 18 percent drop.

Now, when they started up again in '98/'99, at first they operated during those years 50 percent. The rate was minus 3.1 compared to minus 18.1, so that's quite a difference. And then, in 2000

and 2001, when Millstone was operating at 90 percent, the rate actually went up 8.8 percent. So that's from minus 18.1 to plus 8.8. (MPS-3-4)

Comment: Also, what I was trying to talk about before -- Dr. Sternglass sent the NRC a declaration last August which wasn't included in their consideration of the evidence about human health and radioactive emissions, the possible effect on human health. (MPS-3-6)

Comment: ... what he goes on to say is that there is a causal relationship, which the NRC denies between Millstone's radioactive emissions over the years and negative health effects.

As he says, "It is my professional opinion that the radioactive releases from the Millstone Nuclear Power Station, since its startup in 1970, have caused and will continue to cause excess infant mortality, as Joe Mangano just showed us, low birth weight babies, leukemia, and cancer, as well as increased rates of both chronic and infectious diseases in the towns around Millstone as well as in New London County, and Connecticut as a whole." (MPS-3-7)

Comment: So I'm going to address now the things in the draft EIS that gave me problems, because at the last meeting I submitted a number of documents pointing to negative relation -- negative health effects from Millstone's radiation. And one of them was cancer incidence in Connecticut counties, 1995 through '99, from the Department of Public Health, Connecticut Tumor Registry, which indicated that during those -- that period, New London County had the highest rate, age-adjusted rate of incidence of cancers, in the State.

And as I also reported before, it had the second highest such rate for males, not to exclude us. It was basically in a statistical dead heat with Tolland County.

Now, in the draft environmental impact statement, it didn't report the fact that males were second highest. And as I stated at the hearing, that they were basically number one also. So we're showing the highest rates in the State, and this is the most current information from the Tumor Registry. Why is that?

I also reported that report went into specific kinds of cancers, and compared the rates between different counties in Connecticut. And for the number ones, the NRC report characterized them as several. (MPS-3-8)

Comment: ... that's how many number ones New London County had including breast cancer, cervical cancer, uterine cancer, other female genital cancers; liver cancer for males, bladder cancer for males and females, and colon and rectum for females, colon females, totaling 12.

There are six more number twos, five more number threes, seven number fours. (MPS-3-9)

Comment: And also, I presented a document called "The Radiation Compensation Act," an act of Congress in 1990 that compensated people who were downwind from nuclear testing in Nevada and Utah and Arizona, and as well as uranium miners who were -- basically said that these people were injured in the interest of U.S. national security, and they should be compensated.

And it specified specific kinds of cancers and what -- which establishes a causal relationship, once again, between low-level radiation and specific kinds of disease. In this case, there are too many of them that are on the list of -- where New London County in the Tumor Registry report was number 1 through 4.

For instance, liver cancer, which was the number 1 for males, breast cancer number 1, and multiple myeloma in which for females in the county was tied with Fairfield for number 1, and thyroid cancer number 3. (MPS-3-10)

Comment: I have a lot of trouble with all of the -- this entire Section 4.7, evaluation of potential new and significant information on the impacts of operations during the renewal.

I gave one example with a document about cancer rates from the Tumor Registry report. But it -- other information that I presented was not represented accurately, ... (MPS-3-14)

Comment: But the fact that Dr. Sternglass' declaration from last August was somehow not considered whatsoever, and the fact that the NRC consulted with Dominion, with Department of Health here, the Department of Environmental Protection, who basically all have the same position on this issue. They're talking to themselves, where nobody talked to Dr. Sternglass, nobody talked to Joseph Mangano, or anybody else in the Radiation and Public Health Project. (MPS-3-15)

Comment: We now know that the radiation that was released got into our water. We drank from wells. It became part of the soil that we grew our gardens in, and certainly it was in the air that we breathe, at times when they had scheduled releases of radioactive effluent, and then at other times that they had non-scheduled radioactive releases. (MPS-6-7)

Comment: To the extent that this exposure to radioactivity from Millstone was responsible for my father's death, and the deaths and illnesses of my friends and neighbors, these deaths and illnesses were avoidable. (MPS-6-8)

Comment: Environmental exposure to radiation, EMF, and cancer-causing agents. And we can dispute that from now 'til the cows come home. We do know that radiation is a cancer-

causing agent, and we can sit here and deny or we can sit here and face the problem and try to make some kind of an amenable situation for all. (MPS-10-3)

Comment: In addition, we are deeply concerned about the continuous release of radioactive isotopes that are emitted from these plants. These emissions have fallen on Connecticut's soil and water and have been emitted into the air for years.

The effects of radiation are cumulative. Since few studies have been done on the cancer rates around the plants, we only need to use our reasoning powers to understand that the radiation is harmful and that the degree of harm varies from individual to individual.

We do know that children and fetuses are extremely vulnerable to these long-lived and terrible poisons. (MPS-11-2)

Comment: It's 12 different cancers, the highest of which are around Millstone Nuclear Reactor because New London County has the highest cancer.

So I said to you, given these findings, I don't understand how you could say that there is no big link between cancer and Millstone. (MPS-15-1)

Comment: I would like to ask you, how did you analyze the data from the Tumor Registry and come up with what your conclusion is? You just stated that Waterford had one of the lower stats. Well, that stack is several hundred feet high. So whatever is coming out of that is getting into whatever prevailing winds are at that level and traveling.

How did you analyze those statistics and come up with the fact that you don't think that there is any correlation between your emissions of radiation and cancer in this community? (MPS-16-1)

Comment: This is my father, Joseph H. Besade. He worked vehemently to close Millstone, to stop the poison from emitting from the stack into our bodies, causing cancers of all sorts of variations, killing children at such a high rate it's hard to keep track of. (MPS-16-2)

Comment: Our friends, our family, my classmates, my friends, their parents, their children, so many families have been destroyed by this terrible disease that has taken hold of our community, disease that we can only associate with ionizing radiation. (MPS-16-3)

Comment: There is now information, recent information, that gives us the ability to say that there is a correlation between these cancers, these access cancers, especially the ones in children, that says that there is a causal relationship. (MPS-16-4)

Comment: Now, we ingested that shellfish and we ate that fish. And we ate the stuff that came from our garden. And now we know. And we drank the water from our well. And now we know that radiation found its way into the soil and into the air that we breathe and most certainly into the water as well. (MPS-16-5)

Comment: I'm wondering, what geographic area did you decide upon on this issue and why? I mean, you're saying Waterford. Millstone is close to a lot of communities. (MPS-17-1)

Comment: Haddam Neck shut down in 1996. And, besides which, it was only one reactor, and we had three operating here. So the study is totally irrelevant to Waterford and Millstone. (MPS-18-1)

Comment: There is new information, which I have today to submit. And it's from Joseph Mangano from the Radiation and Public Health Project. He sent me these graphs, which show all of the local health declines when Millstone opens, improves after closing. (MPS-18-5)

Comment: The highest cancer rate according to the Tumor Registry of Connecticut, which is our official Tumor Registry, the oldest and best in the country apparently, the highest rates are in New London County. And also then following that, the highest towns are right around Millstone Nuclear Reactor.

So I dispute the NRC's findings that there is no cancer link. (MPS-22-2)

Comment: And certainly the health issue is a second major omission.

At page 4-53 of this report, it states, astonishingly, "No evidence has been presented to report a causal relationship between increased cancer incidence and Millstone operations." That is simply not a true statement because the proceedings before tonight were replete with information and evidence linking Millstone with cancer. (MPS-23-3)

Comment: This evening, the NRC has received evidence that is irrefutable linking the emissions from Millstone, routine emissions, with pollution and contamination of the environment, which we see manifest in dozens and dozens and dozens and dozens of people in this community. (MPS-23-4)

Comment: I will dutifully present to the NRC a map of the different house locations on one street in Waterford. This is Waterford, Connecticut, supposedly doesn't have elevated cancer from Millstone. This is less than two miles down wind northeast from Millstone, at least seven incidences of cancer on that one street. (MPS-23-6)

Comment: Let alone it's a environmental hazzard to Long Island Sounds living fish and creatures and water quality. Its [sic] killing Long Island Sound and the people living near it. (MPS-45-3)

Comment: Mangano stated that cancer rates in the New London area, which used to be below the state average, have risen steadily during the period the Millstone nuclear reactors have been in operation, beginning in 1970.

"In the 1950s and 1960s, cancer incidence in New London County, where Millstone is located, was 8 per cent below the state rate," Mangano said. "After Millstone began operations in 1970, the state rate rose steadily until it reached a level of 6 per cent above the state rate in the late 1990s."
"New London County's current cancer rate is the highest of all counties in the state," Mangano said. (MPS-46-2)

Comment: "Millstone has the third-highest record of airborne radiation releases to the environment of all nuclear power plants operating in the United States according to its own reports," said Mangano.

The official Tumor Registry maintained by the state of Connecticut shows the region around Millstone has the highest incidence of cancers known to be triggered by certain of the radionuclides routinely released by Millstone, according to Mangano. (MPS-46-4)

Comment: In its draft EIS, the NRC concluded that the agency need not consider issues of human health as it relates to radiological emissions from nuclear power plants undergoing relicensing because an NRC guidance document released in 1996 discounted health effects from nuclear power plant radiological releases. (MPS-46-6)

Comment: The data strongly suggests - and indeed does so almost to a certainty - that Dominion Nuclear Connecticut, Inc. is operating and will continue to operate the Millstone Nuclear Power Station in violation of NRC regulations requiring limiting doses to the public of 15 millirems per year to any organ. (MPS-51-2)

Comment: Please use your common sense and protect both the public and the fragile LI Sound environment before you license Millstone to continue for another twenty years. (MPS-55-2)

Comment: The threat posed my Millstone's operation to Long Island's environment and quality of life are larger than the benefits to CT's energy costs. (MPS-60-3)

Comment: There are significant health concerns associated with this plant that merit immediate investigation. (MPS-62-2)

Comment: Long Island Sound is dying and the NRC and EPA seem to care very little for the welfare of the people who consume the fish and shellfish that have managed to survive this long. Our rates of cancer have drastically increased in recent years and someone needs to address the fact that Millstone can be a serious contributor to the food chain poison we consume and breath. (MPS-63-4)

Comment: I am a physician and am truly concerned about the health impact of the radioactive particles on the residents and workers int our area. (MPS-65-2)

Comment: The plant has a negative environmental impact on our waterways and wildlife, in addition to the harmful health hazards posed to humans. (MPS-69-2)

Comment: Millstone has had radiation releases into the local environment many times. (MPS-81-4)

Comment: At our press conference, we introduced Zachary M. Hartley, a 7-year-old boy born with a rare cancer in his jawbone. During critical months of her pregnancy, Zachary's mother swam regularly and unknowingly in the nuclear "mixing zone" which is known locally as the Hole-in-the-Wall Beach. We invited the entire NRC to attend the press conference and address questions to our expert, Dr. Helen Caldicott, world-renowned pediatrician, co-founder of Physicians for Social Responsibility and a leading authority on the health effects of low-level ionizing radiation such as is routinely emitted by Millstone. Zachary's medical records were available for NRC review. Not a single representative of the NRC appeared, not even one of the resident inspectors assigned to Millstone. Dr. Caldicott linked young Zachary's rare jawbone cancer to Millstone's radiological and toxic chemical emissions as being the likely causative agent. Dr. Caldicott acknowledged that, while there cannot be a 100-per-cent certainty that Millstone caused Zachary's medical condition, cesium-137 which Northeast Utilities found in a fish in the same nuclear "mixing zone" in 1997 – the year of Zachary's mother's pregnancy – and which contamination it admitted was discharged by Millstone, is known to be associated with cancer, including cancer of the bone. (MPS-82-8)

Comment: The SEIS fails to meaningfully consider the routine environmental impacts of Millstone's radiological releases, relying on the "conclusion" in the NRC's Generic Environmental Impact Statement that all the nation's nuclear power plants release radiation within levels permitted under the NRC's regulations and therefore may be expected to continue to do so in the future. These conclusions do not apply to Millstone. (MPS-82-11)

Comment: In conclusion, it is clear that the adverse environmental impacts of license renewal are so great that preserving the option of license renewal for energy planning decisionmakers would be beyond "unreasonable" – license renewal for Millstone is a license to kill. (MPS-82-15)

Comment: On December 16, 1997, Zachary M. Hartley was born with a rare jawbone cancer which required major life-threatening surgery. His mother swam regularly in the nuclear/chemical "mixing zone" otherwise known as the Hole-in-the-Wall Beach on the Niantic Bay shoreline during critical months of her pregnancy with Zachary.

In 1997, Northeast Utilities caught a fish contaminated with cesium-137, a deadly carcinogen, it admitted releasing into Niantic Bay, in the nuclear/chemical "mixing zone" which stretches from the Millstone discharge point to the Niantic Bay shoreline, a popular summer destination for families with young children. (MPS-82-19B)

Comment: On August 5, 2004, Cynthia M. Besade reported to the NRC in an affidavit her personal knowledge of some 67 cancers in persons known directly or indirectly to her, all living within or close to the five-mile radius surrounding Millstone, including childhood cancers and the case of a 17-year-old Waterford high school student diagnosed with ovarian cancer; from one street alone – Seabreeze Drive, north-northeast and less than two miles downwind of Millstone – seven (7) cases of cancer were reported. (MPS-82-27)

Comment: On August 5, 2004, Richard Heaton drove seven (7) hours from the University of Pennsylvania Medical Center to New London to participate in a press conference and proceeding before the NRC to share the facts of his daughter's rare thyroid cancer which developed following her exposure to Millstone effluents at age 10. (MPS-82-28)

Comment: In February 2005, the Coalition discovered that Zachary M. Hartley's rare jawbone cancer, believed caused by his mother's *in utero* exposure to Millstone radiological and chemical effluents in the nuclear/chemical "mixing zone" in 1997, was knowingly excluded from listing in the State of Connecticut's Tumor Registry because part of the orange-size cancerous tumor removed from Zachary's mouth in life-saving surgery was determined to be benign. (MPS-82-30)

Comment: On March 10, 2005, Dr. Helen Caldicott, world-renowned pediatrician, authority on the health effects of low-level ionizing radiation and co-founder of Physicians for Social Responsibility, declared the likelihood that 7-year-old Zachary M. Hartley's rare jawbone cancer was caused by his mother's exposure to Millstone's radiological and chemical effluents. (MPS-82-31)

Comment: The Coalition believes that "radiological impacts of normal operations" must be considered on a site-specific basis with regard to Millstone Units 2 and 3 as a Category 2 issue. (MPS-82-56)

Comment: The SEIS does not consider the enormous health care costs associated with the community's long-term exposure to low-level ionizing radiation, nor worker illnesses related to their exposures. We are aware of a recent surgery, upon a patient whose cancer is fairly linked to Millstone radiological and toxic chemical emissions, which cost in excess of $2.5 million. This does not include follow-up or lifelong care. (MPS-82-63)

Comment: ... the Coalition and others have presented overwhelming and unrebutted evidence of a causal relationship between increased cancer incidence and Millstone operations. (MPS-82-65)

Comment: All radionuclides released by Millstone cause cancer.

According to the U.S. Environmental Protection Agency,

Radioactive materials that decay spontaneously produce ionizing radiation. Any living tissue in the human body can be damaged by ionizing radiation. Cancer is considered by most people the primary health effect from radiation exposure. Simply put, cancer is the uncontrolled growth of cells. Ordinarily, natural processes control the rate at which cells grow and replace themselves. They also control the body's processes for repairing and replacing damages tissue. Damage occurring at the cellular or molecular level can disrupt the control processes, permitting the uncontrolled growth of cells – cancer. This is why ionizing radiation's ability to break chemical bonds in atoms and molecules makes it such a potent carcinogen .... There is no firm basis for setting a "safe" level of exposure above background for stochastic effects [those resulting from long-term, low-level exposure to radiation] .... Other than cancer, the most prominent long-term health effects [from radiation exposure] are teratogenic [those that result from the exposure of fetuses or unborn children to radiation] and genetic [those that can be passed from parent to child] mutations.

According to the U.S. Nuclear Regulatory Commission, genetic effects and the development of cancer are the primary health concerns attributed to radiation exposure. (MPS-82-66)

Comment: Millstone discharges these radionuclides and chemicals – and more – into the air and into the nuclear/chemical "mixing zone" known as Niantic Bay, Pleasure Beach and Jordan Cove, defined as an area within 8,000 feet of the Millstone discharge point.

Some of the radionuclides, such as cesium-137, have been found in fish swimming in Niantic Bay.

Some of the radionuclides, such as cobalt-60, have been found in the sediment of Jordan Cove where they enter the food chain when they are ingested by worms.

Some of the radionuclides and toxic chemicals very likely entered Zachary M. Hartley's mother while she was swimming in the nuclear/chemical"mixing zone" popularly known as Hole-in-the-Wall Beach during critical months of her pregnancy with Zachary, according to an expert on the health effects of low-level ionizing radiation, Dr. Helen Caldicott. Four pathways are possible: breathing, swallowing, skin contact and eating a radioactive fish. Zachary was born with a rare cancer in his jawbone requiring lifesaving surgery. (MPS-82-69)

Comment: Millstone's cumulative dose to the environment and humans, based on annual Millstone reports filed with the NRC since 1970, totals over 6.5 curies. As reported in the response to section 2.2.7, releases of tritium into Long Island Sound since Millstone's restart in 1998 are at all time highs in its operating history.

Current annual plant reports indicate that Millstone Units 2 and 3, as in the years since 1970, have been releasing radionuclides such as strontium-90, cesium-137, iodine-131, -133 and -135, cobalt -58 and -60, krypton-85, xenon-131, -133 and -135, and other such radioactive chemicals, all known to be carcinogenic.

The NRC's denial of a causal relationship between Millstone's 35 years of radioactive releases and elevated cancer rates in nearby towns, and in New London County as a whole, does not hold up to scrutiny.

The most glaring example of the NRC's denial in the Millstone SEIS is its complete omission of consideration of the August 17, 2004 declaration of Dr. Ernest J. Sternglass. The Millstone SEIS lists, on page C-9, Dr. Sternglass' declaration as received on August 17, 2004. This is the only mention of it in the SEIS. (MPS-82-70)

Comment: Dr. Sternglass also states in his declaration, "It is my professional opinion that the radioactive releases from the Millstone Nuclear Power Station since its startup have caused and ***will continue to cause*** [emphasis added] excess infant mortality, low birthweight, leukemia and cancer as well as increased rates of both chronic and infectious diseases in the towns around Millstone as well as in New London County and Connecticut as a whole." (MPS-82-71)

Comment: ... in dealing with the Connecticut Tumor Registry's report, "Cancer Incidence in Connecticut Counties 1995-99," the NRC does report that New London County "had the highest

incidence rate of all invasive tumors for females," but omits that this rate was second highest for males, as was reported at the May 2004 public meeting.

Furthermore, the NRC characterizes information in the report indicating that New London County had the highest rate for 12 specific kinds of cancers as "several forms," a choice of words that seeks to minimize a major health crisis.

The NRC also fails to mention information from the report, which was testified to at the May 2004 public meeting, that New London County had the second highest rate for six more kinds of cancer, third highest for five additional ones, and fourth highest for seven more, totally 30 out of 39 kinds of cancers in which New London County was counted separately. (MPS-82-72)

Comment: Similarly, in dealing with a 2003 study by Joseph Mangano et al, presented at the May 2004 public meeting, "Elevated Childhood Cancer Incidence Proximate to U.S. Nuclear Power Plants," the SEIS selectively focuses on information from the study that indicates there may not be a causal relationship between Millstone's radioactive releases and health problems. So the NRC states the study "reported no significant difference in childhood cancer mortality rates between counties surrounding the nuclear plants and the U.S. population."

This would be fine and fair if the agency did not also exclude the major finding of the study, which is that "cancer incidence for children less than 10 years of age, who live within 30 miles of each of 14 plants [one of which is Millstone] in the eastern U.S. (49 counties with a population of more than 16 million) exceeds the national average. The excess 12.4% suggests that 1 in 9 cancers among children who reside near nuclear reactors is linked to radioactive emissions." (MPS-82-73)

Comment: The NRC also failed to mention numerous other studies listed in the bibliography of study that have linked radioactive releases from nuclear facilities to elevated cancers. (MPS-82-74)

Comment: Another example of this exclusion of new and significant information is the NRC's treatment of the 1990 National Cancer Institute study of cancer in counties near nuclear power plants.

That study found that the risk for leukemia in children under 10 in New London County was over 3 times higher than for same aged children in "control counties" used for comparison. (MPS-82-75)

Comment: ... the NRC excluded other NCI information cited by Joseph Mangano in his report, also presented and testified to at the May 2004 public meeting, entitled "2500 Excess Cancer

Cases in New London County Since 1970; Radioactive Emissions From Millstone May Be Cause." In that report Mangano stated, "in Millstone's first 14 years, leukemia cases for New London County children under 10 were ***55% higher*** than the state, and leukemia deaths ***45% higher.*** All scientists agree that children are most sensitive to low-level radiation's effects." (MPS-82-76)

Comment: [In reference to the Connecticut Tumor Registry report on Connecticut towns 1995-99] As the NRC well knows, there is no barrier to prevent Millstone radioactive emissions from traveling beyond the boundaries of the town of Waterford. A more comprehensive such analysis would have included other towns [besides Waterford] near Millstone. But the NRC didn't do that, once again excluding critical information.

However, investigative journalist and author Michael Steinberg of Niantic, CT, did perform such an analysis, including the towns of Waterford, East Lyme, Old Lyme, New London and Groton together. Steinberg's analysis, included herein, found higher than expected incidence of cancer in these towns together for: all female cancers, lung cancer for females, colorectal cancers for females, prostate cancer for males, breast cancer for females, melanoma for both males and females, and cervical cancer for females.

These findings are consistent with findings presented from the Connecticut Tumor Registry's study of Connecticut Counties 1995-99, as well as information presented in Mangano's 1998 study "2500 Excess Cancer Cases...", Sternglass' declaration, and a new study by Mangano presented at the January 11, 2005 meeting. (MPS-82-77)

Comment: Finally, the NRC reports in section 4.7 that a 2000 study by the Connecticut Academy of Science and Engineering (CASE) found that "The town of Waterford was not in the highest ratio category for any cancer except thyroid cancer, and at least three other town had higher ratios for thyroid cancer. At least 30 town had higher ratios for pediatric leukemia (ages 0 to 14) than Waterford."

First of all, this analysis, as reported above, is defective by limiting it to Waterford. Secondly, the CASE study focused on the Connecticut Yankee Nuclear Plant, and Millstone is never mentioned in it. Therefore radioactive emissions from Millstone are not considered in its analysis. Furthermore, information for cancer is not reported statistically by town, other than in maps where towns are not identified specifically but are marked by varying shades of white to black.

Nevertheless, the maps do indicate elevated cancers in towns around Millstone for all the specific kinds of cancers studied: thyroid cancer is elevated not only in Waterford, but also in Groton, Old Lyme and Stonington. Multiple myeloma is elevated for Waterford. And acute adult leukemia is elevated for Groton and Ledyard, both downwind of Millstone. However, while

the CASE study uses information from the Connecticut Tumor Registry for 1976-95, I does not look for trends over those years (e.g. by comparing cancer rate increases or decreases over 5 year periods, as was done in studies by Sternglass and Mangano).

The CASE study was initiated in 1997. At that time, all three Millstone reactors had been shut down for two years because of gross mismanagement and harassment of whistleblowers. (MPS-82-78)

Comment: All the above points to the failure of the NRC to conduct a fair and unbiased analysis of the critical information given as public testimony at the May 2004 pubic meeting in Waterford, Connecticut, and in documents presented there and thereafter to the NRC.

As a result the NRC's conclusion that there is not new and significant information is fatally flawed. The agency excluded and downplayed the critical information that was presented, information that establishes a strong and clear relationship between Millstone's 35 years of radioactive emissions and the concurrent rise of cancers and other diseases in towns around Millstone and in New London County, as well as across Connecticut and into Rhode Island. (MPS-82-79)

Comment: While the Connecticut Tumor Registry is a source of much information about the heightened incidence of cancer and related diseases in the area surrounding Millstone, it is not a completely reliable source of information.

Zachary M. Hartley is not the only victim of Millstone's radiological and toxic chemical releases. In any individual cancer case, a 100 per cent positive correlation with a suspected causative agent cannot be made. That is why we rely on all available information obtained formally – such as the Connecticut Tumor Registry and epidemiological research – as well as informally, through reports of victims themselves or their family members to understand the scope of this public health emergency.

Although Zachary was born in Connecticut with a life-threatening cancer in his jaw and although a tumor the size of an orange was removed from his face when he was 14 months of age, the Connecticut Tumor Registry does not list Zachary's cancer. The Registry's explanation is that a portion of Zachary's tumor was benign and therefore it does not qualify for listing in the Connecticut Tumor Registry. (MPS-82-80)

Comment: The NRC SEIS staff relies on a report of the National Cancer Institute (NCI 1990), which in turn relies on data of the Connecticut Tumor Registry. According to the Connecticut Tumor Registry website, it obtains its funding from the National Cancer Institute. The NCI report is fifteen (15) years old. The NCI report was released four (4) years after Millstone Unit 3

commenced generating nuclear energy and long before many cancers associated with its dangerous emissions might be detected. It does not reflect the extremely high concentrations of strontium-90, a carcinogen, found in goat milk sampled within five miles of Millstone in 2001. It does not report the case of Zachary M. Hartley. It does not report the case of Rachel Heaton, who developed a rare form of thyroid cancer years after swimming in the Niantic shoreline "mixing zone" because she moved from the area. Nor does it report the brain tumor of Charles D. Douton, Jr., one of three former Millstone site maintenance workers who developed brain tumors and were dismissed from their jobs at Millstone by Northeast Utilities, as identified by Cynthia M. Besade in her August 5, 2004 affidavit. The NCI report does not include any of the seven (7) cancer cases recently identified to the NRC SEIS staff among residents or former residents of a single road - Seabreeze Drive - in Waterford two miles downwind from Millstone. The Connecticut Coalition Against Millstone is actively investigating to determine to what extent the Connecticut Tumor Registry fails to maintain records of other Millstone victims. (MPS-82-81)

Comment: The Coalition attaches a selected Bibliography compiled by the Nuclear Information Resource Service ("NIRS") linking nuclear power plant radiological emissions with cancers in their communities. For example, NIRS reports a 400 per cent increase in leukemia incidence in the population living downwind from the Pilgrim (MA) Nuclear Power Plant during the first five years after nuclear fuel was known to have leaked excess radioactivity. A necessary review of Millstone records will reveal the occurrence of leaking fuel at Unit 2 after Dominion assumed ownership. (MPS-82-82)

Comment: The Coalition believes that Millstone discharges as described above are causing grave and irreparable harm to the marine environment and to human health and that such conduct imperils the health and safety of its membership. (MPS-83-3)

Comment: The Millstone discharges as described above are believed to be directly associated with the rare jawbone cancer found in Zachary M. Hartley at his birth on December 16, 1997. The Millstone discharges as described above are believed to be directly associated with a high and increasing incidence of cancer and related diseases among the human population that resides near the Millstone Nuclear Power Station and utilizes the surrounding beaches at Niantic Bay and Jordan Cove, if not beyond. (MPS-83-5)

Response: *The comments are related to human health issues. The staff reviewed these comments for potential significant and new information relating to an alleged causal relationship between radiation releases from Millstone and excess cancer among the population surrounding the Millstone site. As a result of the staff review, Section 4.7 was revised to address these comments.*

Bioaccumulation

Comment: When they say that it's of moderate significance that the fish population -- and the fish are important because we eat fish. If we don't have anything to eat, we die. There is a food chain, and when the fish die because they are eating worms that are radioactive from Jordan Cove -- and I didn't see the Cobalt-60 mentioned -- of Jordan Cove in this report -- then the fish get sick, and the birds that eat the fish get sick, and the people who eat the fish and other things get sick. We all get sick, and it's unnecessary. (MPS-2-8)

Comment: This reference [GEIS Section 4.6.1.1] is entirely omitted from consideration in the SEIS. The SEIS omits any analysis of the predicted buildup of cesium-137 or cobalt-60 or any other radionuclides in the environment surrounding Millstone. To the extent that cesium-137 released to the environment will have enhanced effects, the NRC's staff's failure to assess the impact to the health and safety of the community – including Niantic Bay beachgoers who may be pregnant - borders on reckless endangerment.

It is known that cobalt-60 released by Millstone bioaccumulates in the sediment of Jordan Cove and is therefore subject to being ingested by worms and thereby enter the food chain. Yet, the SEIS fails to "re-examine" this phenomenon – and the potential for bioaccumulation of other radionuclides in the environment surrounding Millstone - consistent with GEIS section 4.6.1.1. (MPS-82-12)

Comment: The SEIS analysis of the collapse of the indigenous fishing stocks does not mention the discovery of a fish caught in Niantic Bay in 1997 contaminated with cesium-137 – nor Northeast Utilities' acknowledgment that the cesium-137 originated in its nuclear operations.

The SEIS analysis does not mention the build-up of cobalt-60 in Jordan Cove near the Millstone discharge point nor does the SEIS analyze the contribution of cobalt-60 buildup in sediment as a contributing factor in the collapse of the population of the bottom-feeding Niantic winter flounder. (MPS-82-49)

Comment: As stated, the bioaccumulation of cobalt-60 in sediment in Jordan Cove near the Millstone discharge point has been established. The SEIS does not address this phenomenon, even though required by the GEIS.

Millstone's monitoring of the aquatic environment in the area of the discharge has also revealed the presence of the following plant-related radionuclides: cobalt-60, zinc-65, silver-110 and cesium-137.

In 1997 and at other times, "[I]ndications of plant releases were observed" in aquatic flora, including detectable levels of cobalt-60, zinc-65 and silver-110. According to the 1997 Radiological Environmental report filed by Northeast Utilities,

The detection of these [radio]nuclides throughout the year, as witnessed by positives detected in other aquatic media, correspond to radioactive liquid discharges from the three Millstone units. Sampling of this media provides useful information because it is very sensitive to plant discharges. However, since seaweed is not consumed, other media are utilized in the determination of dose consequences (e.g., see Shellfish and Fish results)
The presence of cesium-137 in a fish caught in the "mixing zone" within the Niantic Bay – as identified as a plant-related contamination in the 1997 Millstone effluent report – suggests widespread bioaccumulation of that carcinogenic radioisotope within the environment, requiring a "re-examination pursuant to GEIS standards.

The "radiological impacts of normal operations" should be analyzed as a site-specific Category 2 issue. (MPS-82-61)

Comment: Correspondingly, the SEIS failed to conduct the analysis required by virtue of GEIS 4.6.1.1, which provides:

To determine whether the added period of operation following license renewal would, by virtue of buildup, result in significant (double) added dose, the ratios of buildup factors for midlives of 30 to midlives of 20 years were evaluated. These ratios amount to a 35 per cent increase for Cesium-137 and a 6 per cent increase for cobalt-60. This added increase due to buildup will not significantly change the total dose to members of the public.

In certain cases, the bioaccumulation factors may require reexamination. These principally involve fish (in the human food chain) that are bottom feeders. Bottom feeders may ingest worms and other biota that may remobilize radioactive materials accumulated in the sediments.

Accumulation of radioactive materials in the environment is of concern not only to license renewal but also to operation under present licenses.

Accordingly, the SEIS is substantially flawed on the issue of cumulative radiological impacts. (MPS-82-84)

Response: *The Millstone Radiological Effluent Release Reports and Annual Environmental Operating Reports for 2001–2003 are considered to be representative of facility operations during the renewal period. Any gradual buildup of radioactive materials in soils, sediment, and subsequent incorporation into plants or bioaccumulation in fish or mammals from past and current operations would have been reported in the Annual Environmental Operating Reports.*

These data show that all plant operational releases of radionuclides are monitored, releases are below the regulatory limits established for safe operations, and accumulation of radionuclides in environmental media or in the food/milk chain have not been significant. In April 2005, the NRC received Dominion's 2004 Annual Radiological Environmental Operating Report for Millstone. The 2004 radiological environmental monitoring data are similar to the data for the time period 2001-2003. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.

Reference: Dominion Nuclear Connecticut, Inc. (Dominion). 2005. Millstone Power Station, 2004 Annual Radiological Environmental Operating Report. Waterford, Connecticut. April 29, 2005.

Effluent Monitoring

Comment: Despite these comments, it is clear that station monitoring of radioactive effluents is presently inadequate and incomplete and that some radionuclides are released into the environment without measurement or documentation. (MPS-82-36)

Comment: In 1997 alone, there were numerous reported incidences of station radiation monitors being inoperable:

Unit 1 Liquid Radwaste Effluent Monitor (inoperable 6/7/96 – 3/25/97 – 83 days in 1997, 291 days total)

Unit 1 Service Water Effluent Monitor (inoperable 6/9/96 – 7/18/97 – 198 days in 1997, 404 days total)

Unit 2 Steam Generator Blowdown Monitor (inoperable 2/22/96 – 8/26/97 – 237 days in 1997, 551 days total)(NU claims no discharges were made during this period)

Unit 2 Clean Waste Monitor Tank Radiation Monitor (inoperable 5/25/97 – 7/1/97 – 37 days) (NU claims no discharges were made during this period)

Even the GEIS acknowledges that some airborne radioactive effluent releases are not monitored, recorded or documented. (MPS-82-38)

Response: *Effluent releases are reported from samples collected and analyzed in a laboratory. Radiation monitors are used to provide plant operators information during a release. Plant procedures invoke compensatory measures when monitors are inoperable to account for*

all releases. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.

Strontium-90

Comment: Scientists at radiation.org have published a book "The Enemy Within: The High Cost of Living Near Nuclear Reactors." They proved it statistically. They are also documented in the nationwide tooth fairy project, which is documenting Strontium-90 in your baby teeth. Okay? It acts like calcium, radioactive cancer-causing chemical only from the nuclear reactors now, folks, because the nuclear bomb testing stopped quite a while ago.

The Strontium-90 acts like calcium, goes into your bones and teeth, where it nails your immune system, your thyroid function, so you're vulnerable to cancer, bacteria, and viruses.

Now, just to let you know -- a little alert here -- the first lawsuit has already happened. It's directed against the St. Lucie Nuclear Reactor in Port St. Lucie, Florida, because at least five children, last I heard, were suing because they could prove the Strontium-90 in their baby teeth. They did a big tooth fairy project in Florida. The kids with cancer had twice the Strontium-90 levels in their baby teeth as the kids who didn't have cancer.

And according to radiation public health, 35 baby teeth so far in Connecticut, the kids living closest to the nuclear reactors around Indian Point and Millstone Nuclear Reactor have the highest Strontium-90 levels. Okay? (MPS-1-6)

Comment: In addition to Dr. Sternglass' affidavit, you saw us present documents from Joseph Mangano in which he detailed recent analysis of teeth donated by children. And these teeth, according to the declaration provided by Mr. Mangano, were analyzed for Strontium-90 content. And the information that was submitted showed that the baby teeth collected in the State of Connecticut had, in the areas nearest the nuclear power plant, double the level of Strontium-90 as compared with the average -- so-called -- in the population, measured in picocuries per calcium -- gram calcium. (MPS-2-3)

Comment: It also talks about the tooth fairy project, where this group has been testing Strontium-90 in children's teeth. And what it has found in Connecticut so far is that Connecticut has -- along with Pennsylvania has the highest amount of Strontium-90 on average of the six states that they've tested so far.

And as far as the counties near nuclear plants, which are Fairfield near Indian Point and our county, New London, near Millstone, they have the -- an average concentration, 180 percent more, which is more than double that of the other counties in Connecticut. (MPS-3-5)

Comment: It was documented in St. Louis baby teeth. They documented with 35 baby teeth so far that the highest level of strontium-90, the radioactive plants are causing nuclear emission in our baby teeth. The highest is around towns living closest to Millstone Nuclear Reactor and Indian Point Nuclear Reactor. (MPS-22-1)

Comment: We know from Millstone's reports that its strontium-90 has found its way less than two miles down wind to goats because it is revealed in their goat milk. Well, if the strontium-90 is found in goat milk, we know it must also be found in the grass, in the water, in the air, and in people. And can anybody not understand here how it ends up in the teeth of children in this community? (MPS-23-5)

Comment: And from there, you will determine to close Millstone. But before you do that, you will determine that there should be immediate action taken; for instance, filters. The strontium-90 that escapes through the vent at Millstone and contaminates this community can be blocked. (MPS-23-7)

Comment: Laboratory analysis of baby teeth donated by children with cancer in the areas near the Millstone and Indian Point Nuclear Power Plants found levels of radioactive strontium-90 more than twice as high as found in teeth collected from other parts of the state, according to Joseph J. Mangano, National Coordinator of the Radiation and Public Health Project.

"The average level of strontium-90 concentration close to the nuclear power plants was 6.16 picocuries per gram of calcium, compared with 2.70 picocuries in other parts of the state," Mangano said.

"For children suffering from cancer, the average level of strontium-90 concentration was 7.03 picocuries per gram calcium," Mangano said.

"The presence of strontium-90 elevated levels near the nuclear power plants cannot be accounted for other than from their routine releases of strontium-90," Mangano said. (MPS-46-1)

Comment: In its most recent report of radiological emissions to the environment, based on samplings taken in the year 2002, Dominion reported the presence of strontium-90 in the milk of goats living two miles downwind of Millstone.

"Despite information to the contrary in its own reports, the owners and operators of Millstone have denied that strontium-90 found in goat milk near and downwind from Millstone has been

coming from their nuclear reactors," said Michael Steinberg, author of "Millstone and Me," a book analyzing Millstone's radiological releases. (MPS-46-3)

Comment: The Annual Radiological Environmental Operating Report submitted by Dominion Nuclear Connecticut, Inc. to the NRC for the year 2001 – one of the few reports the NRC specifically identified that it had reviewed in its EIS procedure – contains the following information:

On September 19, 2001, a concentration of strontium-90 of 55.5 picocuries per liter (pCi/l) was measured in a sample of goat milk taken from a location 5.5 miles north-northeast of the Millstone Nuclear Power Station. The uncertainty factor reported was plus or minus 5.3 pCi/L.

A concentration of 55.5 picoCuries per liter is an "extremely large concentration, close to twice the highest concentration measured in Connecticut pooled milk at the height of nuclear weapons testing in 1963 of 23 pCi/L," according to a report dated March 1, 2005 by Dr. Ernest J. Sternglass, Professor Emeritus of Radiological Physics at the University of Pittsburgh School of Medicine and an acknowledged pioneer in the field of the effects of low-level ionizing radiation on living cells. The report appears annexed hereto as Exhibit A.

Moreover, according to Dr. Sternglass, since the measured value is ten times as large as the measurement uncertainty, "this is an extremely significant result, with an astronomically small chance that it is a statistical fluctuation."

Put into perspective, an individual drinking two eight-ounce glasses of the strontium-90-contaminated goat milk on a daily basis would receive a maximum permissible dose of radiation – under NRC guidelines – within 30 days.

This assumes no other radiological contamination of the milk. However, strontium-90 never appears alone in the environment. When the radiological effects of identified concentrations of radionuclides also reported in the same goat milk sample - cesium-134, cesium-137, iodine-131, barium-140 and others – are considered, the effect is even more damaging and far less milk would need to be consumed over fewer days before the maximum permissible radiation does established by federal law would be exceeded, according to Dr. Sternglass. "The dose to bone or the bone marrow when other fission products are present is some 5 to 6 times greater than from strontium-90 alone, and the Dominion reports for goat milk show significant concentrations of other fission products, such as cesium-137, in significant concentrations," Dr. Sternglass states in his report, Exhibit A.

"Using the NRC NUREG 1.109 dose factor of 0.0172 mrem/pCi/l [millirem] from Table A-5, a mere 2.4 pCi/l daily intake results in the maximum permissible dose to any organ of 15 mrem per year set by NRC guidelines, 23 times the amount measured in a single liter," according to the Sternglass report.

Attached to Dr. Sternglass' report are measurements, reported to the NRC by Dominion, of strontium-90 in goat milk sampled at locations within 5 miles of Millstone during the years 2001, 2002 and 2003. The reported samples of measurements show concentrations of 13 to 14 pCi/l on other days during the three-year period. According to Dr. Sternglass, these are also significantly high readings since strontium-90, concentrating in milk due to atmospheric nuclear weapons testing which ended in 1980, has declined to less than 1 pCi/1 in areas far removed from any nuclear reactors. (MPS-51-4)

Comment: Strontium-90 is among the most deadly byproducts of nuclear fission. Once ingested, its highly-energetic electrons damage and cause mutations in nearby cells. Exposure to low levels of strontium- 90 and other bone-seeking radioactive chemicals routinely released by nuclear power plants does not merely increase the risk of bone cancer or leukemia, but it weakens the immune defenses provided by the white cells of the blood that originate in the bone marrow. See Declaration of Ernest J. Sternglass (August 8, 2004) submitted to the NRC In the Matter of Dominion Nuclear Connecticut, Inc., Docket No. 50-336-LR, 50-423-LR, ASLBP No. 04-824-01 -LR, annexed hereto as Exhibit B.

"As recently shown in the 2003 report by the European Committee on radiation Risk, numerous epidemiological and laboratory studies have shown that the risk of cancer and other diseases produced by local internal doses to critical organs from fission products that are inhaled or ingested have been underestimated by extrapolation from high external doses by factors of hundreds to thousand of times," according to the Sternglass report, Exhibit A.

"This explains why it now appears that releases from nuclear plants, often acting synergistically with other environmental pollutants, are a major neglected reason for the recent rise of illness and deaths both among newborns and the elderly observed in the U.S. in the last two decades, as also discussed in the ECRR report," according to Dr. Sternglass. Id. (MPS-51-5)

Comment: At the same time, the NRC staff virtually ignored the information available to it even in the limited area it selected for review: the years 2001-2003.

The most glaring example we may provide you of this appears as the preliminary comment we provided to you on, together with the declaration of Ernest J. Sternglass, Ph.D. Dr. Sternglass evaluated Dominion Nuclear Connecticut, Inc.'s reports of strontium-90 levels sampled in goat milk five miles from Millstone during 2001, 2002 and 2003. Although one sample measurement reported by Northeast Utilities in 2001 was at a level nearly twice the highest level of measured strontium-90 concentration in Connecticut milk during the height of the atmospheric nuclear weapons testing in the 1960s, this fact is not reported in the SEIS nor is it analyzed, nor are the other high strontium-90 measurements in goat milk sampled five miles downwind from Millstone analyzed. (MPS-82-6)

Comment: In 2001, Dominion reported concentration levels of strontium-90 contamination in goat milk sampled within five (5) miles downwind of the Millstone Nuclear Power Station nearly twice as high as the highest recording measurement of strontium-90 concentrations in Connecticut milk during the height of the 1960s atmospheric nuclear weapons testing. (MPS-82-24)

Comment: While the strontium-90 concentration in milk declined for the United States as a whole between 1970 and 1975, from 8 pCi/l to 3 pCi/l, it rose from 9.8 in 1970 to a high of 15.8 in 1973 and 14.8 in 1974 near Millstone, remaining at 10.7 by 1975. This is far in excess of the U.S. average of 3 pCi/l, ruling out any significant contribution to the local milk from bomb test fallout by France and China that continued until 1980.

The calculated yearly radiation dose to bone of a child due to excess strontium-90 within 10 to 15 miles of Millstone, in excess of the yearly dose for the United States, rose from 33 millirem per year in the first full year of operation to 204 millirem per year by 1974, nearly three times the normal background level of 70 millirems per year in Connecticut.

These doses of strontium-90 alone may be compared with the 15 millirem per year to any organ permitted under current NRC regulations, the 2 millirem produced to bone marrow in a typical X-ray of a child, and the 80 millirem per year to a developing fetus found to produce a doubling of the rate of childhood leukemia in the studies of the renowned Dr. Alice Stewart. (MPS-82-33)

Comment: As Dr. Sternglass has pointed out, in 2001, Dominion recorded concentrations of strontium-90 in goat milk sampled five miles from Millstone at a level nearly twice that of the highest recorded concentration of strontium-90 in milk in Connecticut during the peak of atmospheric atomic bomb testing in the 1960s. (MPS-82-37)

Comment: Moreover, the SEIS does not identify nor quantify strontium-90 releases, nor note the absence of strontium-90 monitoring from the station stack, while strontium-90 concentrations are regularly found to be inordinately high in goat milk taken from samples five miles from Millstone. (MPS-82-41)

Response: *NRC's Office of Public Affairs has published a background paper entitled, "Radiation Protection and the Tooth Fairy Issue," which contains the following information about Strontium-90 (Sr-90). Approximately 16.8 million Curies of Sr-90 were dispersed globally by atmospheric testing of nuclear weapons before 1980, and Sr-90 has a half-life of 28 years. Therefore, millions of Curies of that Sr-90 is still in the environment and account for about 0.3% of the average annual dose of roughly 300 millirem a person in the United States receives from natural background radiation. An additional 216,000 Curies of Sr-90 were released into the atmosphere as a result of the Chernobyl accident. Altogether, the 103 nuclear power plants in the United States release a total of about 1/1000th of a Curie of Sr-90 each year.*

Dominion's annual radiological effluent reports to the NRC indicate that Millstone releases an average of 2 microCuries (2 x 10^{-6} Curies) of Sr-90 in liquid and gaseous effluents each year. A total of 1 microCurie of Sr-90 was released in gaseous effluents in 2002, and no detectable amount of Sr-90 was released in gaseous effluents in 2001, 2003, and 2004. Millstone also releases a small amount of Sr-89, which has a half-life of about 50 days. Because of the short-life, any Sr-89 in the environment around Millstone could not be from Chernobyl or atmospheric testing and would likely be from Millstone effluents. If Sr-90 is found in the environment without Sr-89 near an operating nuclear power plant, then it is highly likely that the Sr-90 is from Chernobyl or atmospheric testing. No Sr-89 was detected in the gaseous effluents for 2001, 2002, and 2003. In 2001, 2002, 2003, and 2004, 20 microCuries, 200 microCuries, 220 microCuries, and 90 microCuries of Sr-89 were released in liquid effluents, respectively.

As part of its radiological environmental monitoring program, Dominion obtains milk samples from goats at farms near Millstone and performs radio-chemical analysis to determine the concentrations of Sr-89 and Sr-90 in that milk. Dominion's annual radiological environmental monitoring reports to the NRC typically indicate concentrations ranging from below the lower limit of detectability to 15 picoCuries (15 x 10^{-12} Curies) of Sr-90 per liter of milk, and the concentrations of Sr-89 are below the lower limit of detectability. Dominion has concluded that the Sr-90 is from atmospheric testing of nuclear weapons or the Chernobyl accident because the plant would have to release Curies of Sr-90 (not microCuries) to result in the concentrations measured in the milk.

Sometimes higher concentrations of Sr-90 are found; Dominion reported a concentration of 55.5 picoCuries (55.5 x 10^{-12} Curies) of Sr-90 per liter in goat milk that was composited from July, August, and September of 2001 at a farm approximately 5 miles from the plant. Dominion believes that the goats sometimes begin to nibble the roots of the pasture grass. Along with the grass roots, the goats may also ingest some soil that contains Sr-90 left in the environment from atmospheric nuclear testing. Analyses of the same goat milk indicated that the concentration of Sr-89 was below the lower limit of detectability, another indication that the Sr-90 is not from Millstone.

The Connecticut Department of Environmental Protection (CTDEP) also analyzes goat milk from the same locations as Dominion and has obtained similar analysis results. CTDEP has not identified any evidence of the Sr-90 in the goat's milk as being from Millstone. The NRC inspected the monitoring programs at Millstone and reviewed Dominion's annual reports and came to the same conclusion.

Based on the sources of Sr-90, measurements in the environment, and health effects studies (see Section 4.7 of the SEIS), the staff concludes that the comments provided no new and

significant information on Sr-90 releases from Millstone and their impact on human health; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.

Chemical and Radiological Synergistic Effects

Comment: I have heard a lot of testimony tonight about risk factors for the people living in this community. We seem to be having cancers. And it's very hard to pinpoint exactly what the causes of those cancers are.

The effect of all sorts of toxins in our environment is cumulative. And I want to suggest that, like the flounder, we are a vulnerable population and that any additional risk is unacceptable. (MPS-25-3)

Comment: There is a need for an independent epidemiological study of areas around the plant beyond Waterford and including New London County and parts of Long Island where cancer clusters have been identified. Radioactive and chemical contaminants are routinely released from the plants into air and water. (MPS-28-6)

Comment: At the very least, the NRC should be required to evaluate the environmental impact of Millstone's radiological and chemical effluents – singly, in synergy and cumulatively - under site-specific analysis to qualify under the standards of the National Environmental Policy Act. (MPS-82-35)

Comment: Many chemicals discharged by Millstone are known carcinogens, such as hydrazine, hexavalent chromium, cadmium, lead and benzene and many others. Millstone routinely discharges into the nuclear/chemical "mixing zone" which extends 8,000 feet toward the Niantic and Waterford shorelines, the following chemicals and others: Chemicals & Metals "Known or Suspected Present" in Discharge [156 compounds listed] (MPS-82-67)

Comment: The interaction of radionuclides and chemicals has been established to create a synergy, multiplying the harmful effects of each. (MPS-82-68)

Response: *These comments relate to the possible synergistic effect of chemicals and radiation. A synergistic effect is a biologic response to multiple substances where one substance worsens the effect of another substance. Thus, the combined effects of substances acting together may be greater than the sum of the effects of substances acting by themselves. However, in the case of Millstone, the chemical releases and radiation exposure are within the standards set forth by the NRC and EPA. The standards for chemical and radiation exposure are set conservatively, in part to address the potential for synergistic effects. The comments*

provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.

Electromagnetic Fields

Comment: In addition to my concerns, it appears the NRC down plays the impact of EMF on the people and the environment. (MPS-30-3)

Response: *The comment relates to the impacts of the electromagnetic fields associated with the transmission lines. These impacts are discussed in Section 4.2 of the SEIS. The comment is general in nature and provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.*

Occupational Exposure

Comment: You mentioned the Columbia Healthy Worker Effect Report. It sounded a little confusing to me, because originally the Healthy Worker Effect was discovered or outlined by Dr. Mancuso with the help of Dr. Stewart, Alice Stewart, from Great Britain.

And the point of that Healthy Worker Effect was that the people hired to work on a regular basis at nuclear plants at the particular site that they were referring to are people at the prime of their life in a healthy condition.

Therefore, the effects of radiation are not as powerful on them as it is on infants and old people and children in utero, so that they pointed out that was not a good basis on which to establish safety standards which are the standards which are now being based -- they are based on.

And, therefore, those standards are wrong,... (MPS-5-2)

Comment: They accepted that working there posed some risk, and that they would be exposed to some types of radiation. But never were they told that they were not protected fully. (MPS-6-5)

Comment: In 1993 -- excuse me, 1994, that department was deleted. Those people were met at the door and told that they had lost their jobs.

Why? Well, they talked about it being downsized. Well, in reality, three people in that department with brain cancer probably scared them to death, especially when two of them died. The third remains alive but does not enjoy the quality of life that any of us do. (MPS-6-6)

Comment: In 1996, after workers in the site maintenance department at Millstone were diagnosed with brain cancers and Northeast Utilities dismissed the entire department – after securing releases the workers would not sue Northeast Utilities if the company paid them double severence pay – and hired transient contract workers to perform hot and dirty tasks within the plant, two of the workers died untimely deaths due to their brain cancers. (MPS-82-19A)

Comment: On August 16, 2003, Joseph H. Besade became the seventh known pipefitter to die prematurely from workplace exposures at Millstone. (MPS-82-26)

Response: *The comments relate to occupational exposure. Section 4.7 discusses concerns about radiation exposure and cancer in general; that discussion is also applicable in response to these comments that relate specifically to the potential causal link between occupational radiation exposure and cancer.*

Although radiation may cause cancers at high doses and high dose rates, currently there are no data that unequivocally establish the occurrence of cancer following exposure to low doses and dose rates, below about 0.1 sievert (Sv) (10 roentgen equivalents man [rem]). However, radiation protection experts conservatively assume that any amount of radiation may pose some risk of causing cancer or a severe hereditary effect and that the risk is increased for higher radiation exposures. Therefore, a linear, no-threshold dose-response relationship is used to describe the relationship between radiation dose and detriments such as cancer induction. Simply stated, any increase in dose, no matter how small, results in an incremental increase in health risk. This theory is accepted by the NRC as a conservative model for estimating health risks from radiation exposure, recognizing that the model probably overestimates those risks. Based on this theory, the NRC established a conservative limit of 0.05 Sv per year (Sv/yr) (5 rem per year [rem/yr]) in 10 CFR Part 20 for radiation doses to people exposed to radiation as part of their job, such as operating personnel at nuclear power plants.

Many studies have been performed on the health effects of radiation exposure, and none of the scientifically valid studies show any health effects at acute doses less than 0.1 Sv (10 rem), which is double the occupational dose limit of 0.05 Sv/yr (5 rem/yr). In addition, the average dose to a nuclear power plant worker is less than 0.01 Sv/yr (1 rem/yr); therefore, the NRC concludes that the health risk from occupational radiation exposure to nuclear power plant workers is very small.

Research on the effects of radiation on the health of workers is ongoing. A new study of U.S. nuclear power industry workers entitled, "Analysis of the Mortality Experience Amongst U.S. Nuclear Power Industry Workers After Chronic Low-Dose Exposure to Ionizing Radiation," was recently published by Howe et al. in Radiation Research (Volume 162, pages 517–526, 2004),

the official journal of the American Radiation Research Society. The study, by Columbia University's Mailman School of Public Health, tracked more than 53,000 workers from 15 nuclear utilities in the U.S. for periods of up to 18 years between 1979 and 1997. No statistically significant associations with radiation were found for mortality from leukemia and other cancers. Additional information about the findings of this study is available at: http://www.bioone.org/bioone/?request=get-abstract&issn=0033-7587&volume=162&page=517.

The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.

Comment: ... the SEIS fails to identify or evaluate any "additional maintenance, testing and inspections as a result of a variety of age-related changes in operational procedures" at Millstone.

With regard to the above statement:

Added maintenance, testing, and inspection will be accompanied by increased exposure time to members of the work force but are not expected to significantly influence dose to members of the public

the SEIS fails to identify or evaluate any "added maintenance, testing, and inspection "at Millstone and hence fails to evaluate increased exposure time to members of the work force and members of the public during the proposed renewal period." (MPS-82-58)

Response: *The comment relates to possible dose increases. Sections 2.2.7 and 4.3 discuss the expected impacts of radiation exposure to workers and the public during the license renewal period. Programs designed to manage aging of structures, systems, and components during the license renewal period may add maintenance, testing, and inspection requirements at Millstone; however, these added requirements are not expected to significantly increase doses to workers or to the public. The comment provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.*

Comment: The SEIS also fails to consider the environmental impact of Dominion's August 24, 2004 submittal to the NRC requesting approval of the "Nuclear Facility Quality Assurance Program Description." According to an Request for Additional Information ("RAI"), dated February 24, 2005, this program deletes from the Millstone Quality Assurance program radiological protection responsibilities which include "maintaining records and reports on radioactive contamination levels." If this application is approved, a safeguard to protect against excessive worker radiological contamination will be lost and there will be no basis for the NRC

to conclude now that occupational radiation exposures during the license renewal term will be small and within regulatory limits. (MPS-82-59)

Response: *The comment relates to radiological protection recordkeeping. Dominion's license amendment request dated August 24, 2004, addressed by the comment, is under review by NRC radiation protection experts. The license amendment, if granted, will not change the requirements for monitoring, recording, and reporting doses to workers under 10 CFR Part 20. The comment provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.*

Regulatory Standards

Comment: In addition, you saw that we presented a report, a recent report from the European Commission on Radiation Standards, which in very conscientious terms analyzed the present levels/standards of radiation exposure that are being applied in these present proceedings and found, on the basis of overwhelming scientific evidence, that the standards are probably 100 to 1,000, or possibly more, understated, and that the standards should be very, very significantly heightened in order to protect the population from disease from cancer and even genetic mutation. (MPS-2-4)

Comment: ... there has been very much research done at the cellular level, which has shown -- and this is pointed out in the BEIR V, which is the National Academy of Sciences -- the Biological Effect of Ionizing Radiation -- in BEIR V, they make the statement that any -- any amount of radiation can cause harm.

So a single ionizing event of radiation can cause harm, and that's what is being looked at at [sic] the cellular level. And at this point it's being shown that the ICRP and those bodies that are setting the standards are 100 or even 1,000 times off the base.

And where we couldn't account for many of the leukemia and cancer clusters in various parts of the world, it's shown that if you discount ICRP and start to look at some of the cellular research, such as the bystander effect, which is where an ionizing track passes by a cell, a nearby cell, it doesn't have to touch the cell, but the energy given off will affect the cell.

And then we have the second event theory put out by Chris Busby in England, whereby DNA -- the DNA is hit by an ionizing particle and a second event occurs within a short period of time before the cell can -- the DNA cell can repair the damage, and then it mutates.

These have been shown -- this research has been shown to account now for these cancer clusters that we see around nuclear facilities. And I would urge people to go beyond the ICRP and UNSCEAR and look at some of the more recent research.

In the UK now, they have the -- in Europe, I should say, they have the European Committee on Radiation Risk, which looked at the ICRP model and found it's badly flawed, and we should be looking in other directions at that, which they are doing. (MPS-4-3)

Comment: You referred to the ICRP and other agencies, which primarily refer to externally received rems/doses of radiation. What I want to know is: have you looked and are you considering the latest information, the latest scientific information, both from Great Britain and from the United States, that refer to internal emitters and the effect of internal emitters? (MPS-5-1)

Comment: The Coalition notes that the European Committee on Radiation Risk ("ECRR") has reported that radiation dose models employed by the NRC and other governmental agencies are probably 100 to 1,000 times too high to be accurate. (MPS-82-83)

Response: *The comments relate to the NRC's radiation protection standards. The NRC's regulatory limits for radiological protection are set to protect the public from the harmful health effects of radiation as discussed in Section 4.7. These radiation standards reflect extensive study by national and international organizations (e.g., International commission of Radiological Protection, National Council on Radiation Protection and Measurements, and the National Academy of Sciences) and are conservative to ensure that the public is adequately protected.*

The European Commission on Radiation Protection concluded in Radiation Protection Report 125, "Low Dose Ionizing Radiation and Cancer Risk" that the lifetime cancer risk estimate for acute high-dose exposure made by UNSCEAR in its 2000 report agrees well with those made by UNSCEAR and ICRP in previous evaluations. Scientific evidence has not shown any health effects in connection with low doses of radiation at low dose rates (less than 10 rem). This conclusion is also supported by the Health Physics Society in its 2004 position statement, "Radiation Risk in Perspective." The NRC's regulatory limits for members of the public are expressed in mrem/yr (EPA standard is 25 mrem/yr). The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.

Reference: European Commission on Radiation Protection. 2001. Radiation Protection Report 125, "Low Dose Ionizing Radiation and Cancer Risk." Accessed at: http://europa.eu.int/comm/energy/nuclear/radioprotection/publication/doc/125_en.pdf on June 24, 2005.

Reference: Health Physics Society. 2004. Position Statement of the Health Physics Society, "Radiation Risk in Perspective." August 2004. Accessed at: http://hps.org/documents/radiationrisk.pdf on June 24, 2005.

Breast Cancer

Comment: But radiation.org did their research, and they proved statistically -- and published it in a book -- years ago that women who live within 100 miles of a nuclear reactor have the greatest risk of dying of breast cancer.

Now, anyone who doubts this information, you can see it visually. And this is the NRC's own map. So how do they refute their own map? And how do they refute the government that they work for? Here you go, folks. Here is the breast cancer mortality for women, 50 to 74 years old dying of breast cancer. It's not about any one town. (MPS-1-2)

Comment: This is the NRC map. Okay? I'll make it easy for you. There is a correlation. These are government maps that show that 20- to 49-year olds are dying in the northeast, and the 40- to 74-year olds that die in the northeast, and the Tumor Registry confirms it. (MPS-1-4)

Comment: That's why they have a nine-year old child down there in Long Island with breast cancer, and the government did a $6 million study to find the cause of breast cancer. They couldn't find it because they just happened to leave out the nuclear emissions as part of the study. That was exposed in the New York Times article by Dr. Janet Sherman, who works for Radiation.org. It was published. (MPS-1-5)

Comment: I'm hit by both nuclear reactors. I'm within that 100-mile radius. That radiation.org documented statistically proves the risk for breast cancer mortality is greatest if you're within the 100 miles. (MPS-22-3)

Comment: This is the government maps, no dispute, folks. The government that employs the NRC has funded and done these maps. Okay? This is the breast cancer mortality link to nuclear reactors. (MPS-22-4)

Comment: The areas of high breast cancer mortality line up with the location of nuclear reactors. And that is why the Northeast has the highest breast cancer mortality. (MPS-22-5)

Response: *Section 4.7 discusses concerns about radiation exposure and cancer in general; that discussion is also applicable in response to these comments that relate specifically to the potential link between radiation exposure and breast cancer.*

Nuclear power plants frequently sited within 50 miles of major population centers because that is where the power demand is greatest. According to 1990 census numbers compiled for the 50-mile emergency planning zones (EPZ) (2000 aggregate numbers are not yet available) of nuclear reactors, approximately 130,000,000 people reside within these 50 mile EPZs. With almost half of the United States population living within 50 miles of a nuclear power plant,

statistically, it is expected that the occurrence and mortality of breast cancer, as well as other diseases, would be more readily seen in this large population.

According to the American Cancer Society (ACS), mortality rates across the general population of the United States from breast cancer were steady from 1950 until approximately 1990. From 1989 to 1998, breast cancer mortality declined by as much as 3.4% annually. These decreases, according to tables on the ACS web site, occurred in states with nuclear reactors as well as in states without nuclear reactors.

The ACS, as discussed in its publication "Breast Cancer Facts & Figures 2001-2002," states that the apparent increase in incidence of breast cancer during the 1980s is attributable to "increased detection through greater use of mammography screening, with diagnosis of smaller, more easily treatable cancers than would have occurred otherwise." The ACS further states that "perceptions of increasing breast cancer cases in young women in the late 1980s and early 1990s are largely due to the growth and aging of the US population, as many "baby boomer" women reached ages 25–40 at that time." The ACS further noted that since 1985, breast cancer incidence rates among women under 40 have actually declined significantly at an average 1.3% per year.

In 1990, at the request of Congress, the National Cancer Institute (NCI) conducted a study "Cancer in Populations Living Near Nuclear Facilities," to look at cancer mortality rates around 52 nuclear power plants (including Millstone), nine Department of Energy facilities, and one former commercial fuel reprocessing facility. John Boice, Sc.D., who was chief of NCI's Radiation Epidemiology Branch at the time of the survey, concluded: "From the data at hand, there was no convincing evidence of any increased risk of death from any of the cancers we surveyed due to living near nuclear facilities,...." In addition, based on analyses of data from the Connecticut Tumor Registry, the Connecticut State Department of Public Health concluded that there is no increased cancer incidence in Connecticut due to radiation exposure from Millstone. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.

Analysis and Process

Comment: By its own admission, the NRC confined its review of Millstone radiological releases, for Environmental Impact Statement purposes, to the years 2001, 2002 and 2003. ("Radioactive Waste Management Systems and Effluent Control Systems 2.1.4," DEIS at 2-9) (No explanation is provided in the DEIS as to why the years 1970-2000 and the year 2004 – with the most current data – were excluded from review.) (MPS-51-3)

Comment: Although Millstone's reactors have been operating since 1970, and thus have generated a 35-year history of operations and record of environmental impact, the NRC selected only a *three-year period* (2001, 2002 and 2003) to review to assess Millstone radiological emissions for purposes of its SEIS evaluation. Necessarily, the NRC staff's superficial and selective review deprived it of the opportunity to engage in a meaningful assessment of the environmental impacts of Millstone's complete operating history to inform the evaluation necessary to evaluate the full scope of future effects during a potential period of license extension. (MPS-82-5)

Comment: The Millstone Draft Environmental Impact Statement analysis largely avoids the **primary issue** presented by the prospect of relicensing Millstone Units 2 and 3 for additional 20-year terms: the effects of routine releases of radiological and toxic chemical releases to human health and the environment surrounding the nuclear facility. (MPS-82-16)

Comment: The NRC's Generic Environmental Impact Statement ("GEIS") was published in the year 1996, or nine (9) years prior to the NRC's invitation for public comment on the SEIS, at a time when Unit 2 had operated for 26 years, Unit 1 for 21 and Unit 3 for 10 years. Necessarily, when the GEIS refers to "current levels" of radiation, it is referring to radiation levels which were "current" in 1996 or earlier. The GEIS is not itself current, but is outdated and fails to account for the past nine (9) years of operations within the U.S. nuclear industry.

The GEIS itself is obsolete. Although the NRC staff states in the SEIS it was not required to consider site-specific aspects of Millstone's routine radiological emissions because Millstone site-specific routine radiological emissions were considered in the GEIS at Appendix E, GEIS Appendix E is limited to "routine" radiological emissions during the years 1985-1987. No explanation is given why a report published by the NRC in 1996 relies on 10-year-old data, when its purpose is to project radiation levels five decades into the future. At best, GEIS's radiological analysis of "routine" Millstone radiological emissions is incomplete and superficial. (MPS-82-17)

Comment: Moreover, Millstone is unique in the annals of the U.S. nuclear industry: Millstone has released the highest levels of radionuclides of any nuclear power station in the country at various times over the past 35 years of its operational history.

From 1970 to 1987, Millstone had released a total reported release of 32 curies of radioactive iodine and particulates into the air, which included the highly carcinogenic strontium-90 and iodine-131, together with 6.7 million curies of total fission and activation gases such as xenon and krypton. During the same period, Millstone released 581 curies or 581 trillion picoCuries of radiation in the highest liquid volume of such releases of mixed fission and activation products of any nuclear plant in the United States.

In a single year, 1975, Millstone released a record reported high of 9.99 curies of iodine and particulates into the air and 199 curies of liquid mixed fission and activation products into the Long Island Sound, also a record for all U.S. reactors.25 Id. (MPS-82-32)

Comment: These figures [in the SEIS] do not break down the radioisotopes released, other than for Iodine-131 and Tritium, and do not identify nor quantify which radioactive gases are emitted, such as xenon-137 (with a half-life of 3.9 minutes decaying to cesium-137 with a half-life of 30 years); xenon-135 (with a half-life of 9.17 hours decaying to cesium-135 with a half-life of 3,000,000 years); nor krypton-89 (with a half-life of 3.2 minutes decaying to strontium-89 with a half-life of 52 days). These radioactive materials are long-lived and have cumulative impacts. The SEIS does not analyze these environmental impacts. (MPS-82-39)

Comment: Since the SEIS analysis was self-limited to the years 2001, 2002 and 2003, and annual releases for the 32 other years Millstone has been operating were not considered, the statement that "These releases from both units are typical of annual releases from Millstone" is not substantiated.

Moreover, the SEIS statement, that [these releases] are not expected to increase during the renewal period" is incorrect. First, releases of tritium, a known cancer-causing radioactive toxic with a half-life of 12.3 years. are trending upward. Second, as Units 2 and 3 operate for longer periods at full capacity, airborne radioactive emissions will increase. Similarly, if during the renewal period Millstone Units 2 or 3 receive approval for power upgrades, airborne radioactive emissions will increase. The consequences of these reasonably foreseeable circumstances were not analyzed in the SEIS. (MPS-82-40)

Comment: The NRC GEIS staff review of Millstone data on the most critical issue of "radiological impacts of normal operations" was self-limited to the years 1985, 1986 and 1987. Thus, in its consideration of whether the Millstone Nuclear Power Station should be permitted to operate in the years 2015-2025 (Unit 2) and 2025-2045 (Unit 3), the NRC deliberately failed to consider the "radiological impacts of normal operations" for the years 1970-1984, 1988-2000 and 2004 to the present.

Put another way, the NRC considered Millstone's "radiological impacts of normal operations" for only 6 of the 35 years the Millstone nuclear reactors have been routinely releasing harmful radiation into the environment – just 17 per cent of Millstone's operational history. Twenty-nine (29) years of Millstone's routine releases of harmful radiation releases to the environment are not evaluated in either the GEIS or the SEIS.

By limiting the pool of data considered in the GEIS and the SEIS to a period of time which encompasses only 17 per cent of Millstone's operational history of harmful radiation releases to the environment, the NRC failed to consider all available information. The NRC's evaluation of future impacts based on past impacts rests of an inadequate data base and its conclusions are accordingly unreliable, if not invalid. Certainly, the NRC staff's consideration of "cumulative" impacts (SEIS section 4.8.3) is scientifically unsound if not indeed scientifically fraudulent, since the NRC staff did not review, tabulate or assess the full scope of past impacts to be able to "accumulate" cumulate impacts.. (MPS-82-55)

Comment: Finally, as stated, the SEIS states that the NRC staff is not required to evaluate Millstone radiation releases on a site-specific basis because Millstone releases were subjected to site-specific analysis in the GEIS which found them to be "well within regulatory limits." This statement is most misleading in that it fails to acknowledge that the NRC GEIS staff limited itself to reviewing Millstone's reported radiological emissions for the years 1985, 1986 and 1987 only. Millstone's largest reactor, the 1,220-megaWatt Unit 3 – was still under construction in 1985. By the year 1987, it had not established an operational record; it has since substantially increased output and, hence, "routine" radiological emissions. (MPS-82-57)

Response: *The comments relate to the analysis process used in preparing the SEIS. The NRC concluded that the radiological effluent data for the time period 2001–2003, the most recent data, was the best indicator of the radiological effluents that would be expected during the renewal period. In April 2005, the NRC received Dominion's 2004 Radioactive Effluent Report for Millstone. The 2004 data are similar to the data for the time period 2001-2003. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.*

Reference: Dominion Nuclear Connecticut, Inc (Dominion). 2005. Millstone Power Station, 2004 Radioactive Effluent Release Report. Volume 1. Waterford, Connecticut. April 30, 2005.

Tritium

Comment: in the draft EIS on page 243 it says, in relation to radioactive-type stuff, "The applicant does not anticipate any significant changes to the radioactive effluent releases of exposures from Millstone operations during the renewal period. And, therefore, the impacts to the environment are not expected to change."

Now, unfortunately, from -- this is from Dominion's annual radiological environmental operating report from 2003, where it's talking about Tritium, which is radioactive hydrogen. It says, "Since the restart of Unit 3 in 1998, and Unit 2 in 1999, Tritium releases in liquid effluents have risen to levels at or above those observed in the pre-shutdown period."

Now, the Tritium releases into Long Island Sound are at record highs for Millstone. And so that doesn't agree with the conclusion of the NRC, which says they're going to stay the same. (MPS-3-11)

Comment: The water does go back into Long Island Sound. And it's full of tritium. And the more that the plant runs at full power, the more tritium gets put back into Long Island Sound. That's not new, but it's a fact, and it's an environmental fact. (MPS-18-9)

Comment: According to the Coalition, Millstone radiological releases of tritium - radioactive hydrogen - to the environment are increasing to all-time highs. (MPS-46-5)

Comment: ... in Dominion Nuclear Connecticut Millstone Station Annual Radiological Operating Report 2003, in section 4.14, Seawater, on page 4-9, it is stated, "since the restart of Unit 3 in 1998 and Unit 2 in 1999, tritium releases in liquid effluents have risen to levels at ***or above*** [emphasis added] those observed during pre-shutdown period."

Dominion records indicate that Millstone released 1854 curies of liquid radiation in 2000, an all time high. Such reported releases totaled 1273 curies in 2001, 1537 in 2002 and 1278 in 2003. NRC records for Millstone's liquid tritium releases totaled from 1970-1994 totaled 11,550 curies. The total from 1995-2003 was 8551 curies. (MPS-82-42)

Comment: It is undeniable that the more the pressurized water reactors of Units 2 and 3 operate, the more tritium by-products they will create and release into the environment.

The current stated policy of both Dominion and the nuclear power industry in general is to operate power reactors as close to maximum capacity as possible. In 2003 Millstone 3 operated at almost 100% capacity. Millstone 2 operated at 80% capacity, but only because it shut down for refueling.

The increasing amounts of tritium discharged into Long Island Sound means that Dominion's claim that it "does not anticipate any significant changes to radioactive releases or exposures from Millstone operations during the renewal period" is false. Therefore the NRC's conclusion that "impacts to the environment are not expected to change" is also false. (MPS-82-43)

Comment: Given this history, the NRC should mandate the immediate installation of filters to mitigate liquid tritium discharges from Millstone units 2 and 3. In addition, the NRC should mandate the testing of drinking water, well water and groundwater and in marine life in areas affected by Millstone for the presence of tritium. At present only sea water is tested for tritium.

Until these measures have been put into place and monitoring results have been made public until Millstone's current operating licenses expire, or units 2 and 3 permanently shut down, the NRC should not consider granting license extensions for Millstone units 2 and 3, in consideration of the health and safety of the public. (MPS-82-44)

Response: *Tritium releases during the renewal period are not expected to differ significantly from the releases that occurred during 2001–2004. Data from the Millstone Radioactive Effluent Release reports are provided in the following table. Tritium dose is reported as part of the whole body dose. The average maximum hypothetical whole body dose to a member of the public from all Millstone liquid effluent sources from 2001 through 2004, as shown in the following table, was 0.00305 mrem/yr or about 0.1 percent of the 10 CFR Part 50, Appendix I dose design objective. Additionally, despite the claims of some of the commenters, there is no commercially and economically viable method of separating tritiated water from natural water. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.*

Year	Unit 2 capacity	Unit 3 capacity	Tritium released U2 (Ci)	Tritium released U3 (Ci)	Total annual whole body dose all sources (mrem)	10CFR50, Appendix I annual dose design objective (mrem)
2001	95.3	80.8	755	518	0.00307	3
2002	81.3	86.4	207	1,330	0.00203	3
2003	80	98.8	624	654	0.00536	3
2004	97.6	88.2	265	1280	0.00175	3
4-year average	85.5	88.7	529	834	0.00305	-

Socioeconomic Impacts of Human Health

Comment: Yes, I do. I'm looking at I guess the economics of -- not just the economics of a town and what would happen to the taxes if it closed or stays open or whatever, but what about the economics of people with cancer? That's another economics that's factored in.

It caused people to get sick, and it cost the town and the insurance companies to pay for it, not just the tax benefit to having a nuclear power plant versus the cost to shut it down. So there's

the human side, plus the financial side. That's what I'm getting at. I think it's terribly important to those of us who have been impacted.(MPS-1-1)

Comment: Now, a time is opening up for us to change our ways. If we calculate the full cost of the ways we generate energy -- and I didn't hear the whole of the presentation, but I think the hidden costs were not mentioned, the health costs for instance, we learn that we can't afford to -- not to change our ways. (MPS-11-9)

Response: *Human health issues were evaluated in the GEIS and determined to be Category 1 issues. The staff determined in the GEIS the impacts to human health were SMALL. Health and socioeconomic information related to the area around Millstone was provided during scoping and the public comment period. This information was evaluated and did not constitute significant, new information. The staff determined the impacts to human health from operations during the license renewal period were SMALL. Therefore, cost impacts associated with health issues would also be expected to be SMALL. The comments provide no new information, therefore, were not further evaluated. No changes were made to the text of the SEIS.*

10. Comments Concerning Uranium Fuel Cycle and Waste Management

Comment: How can a decision be made on impact of spent fuel on the system when we have no real plan in this country for dealing with spent fuel?

The future of Yucca Mountain, which is the designated repository, is in doubt over many, many areas, both technical, legal, and environmental. And the possibilities of moving fuel to Yucca Mountain within the next 20 or 30 years seems very remote.

So how can we talk about the impact of spent fuel on this impact -- on this statement here when we don't have a real answer to it, other than to -- talking about putting it into dry cask storage on site, which, to me, makes the site a long-term repository for spent fuel which, my understanding is, is not allowed under the laws of Connecticut. (MPS-4-1)

Comment: In our view, site analysis should include, but not be limited to, stringent oversight of the physical plant, the management, detailed plans for transportation of fuel, and the final repository of waste materials, and placement of a plant in a remote location so that in the unlikely event of a catastrophe evacuation is feasible. We do not believe that this application meets those criteria. (MPS-9-1)

Comment: We are concerned also about the regulation and potential deregulation of what are termed "nuclear waste" and about the impact on Long Island Sound and the nation as a whole. (MPS-9-4)

Comment: Not only do we have to be concerned about a nuclear accident or attack, but we also have no place to put the spent fuel, and this poses an entirely whole set of other problems. (MPS-10-6)

Comment: ... the obvious objection I had to this report is the separation of the waste issue from relicensing. And I did get to speak about that a little bit. High-level waste is a major problem that our government can't seem to solve in the nuclear industry. (MPS-18-12)

Comment: Although I think that dry cask storage of radioactive waste at the plant is preferable to keeping the waste in a "wet" pool, the fact is that this is not a long term solution to the problem of disposing of the waste. We do not have a long term plan for dealing with the radioactive byproducts of nuclear power plants, so I would prefer that we not renew any nuclear power plant facility license.

Please keep in mind that any solution so far proposed to dealing with radioactive waste is expensive and should be considered part of the operating expense of any nuclear power plant. It is not a separate and unrelated cost to the running of such a facility and should not be presented to the public as so. I do not wish for my taxpaying dollars in any way to continue to support the license of new or renewal of any nuclear power facility. (MPS-34-2)

Response: *Onsite storage of spent nuclear fuel is a Category 1 issue. The safety and environmental effects of long-term storage of spent fuel on site have been evaluated by the NRC and, as set forth in the Waste Confidence Rule (10 CFR 51.23), the NRC generically determined that such storage could be accomplished without significant environmental impact. In the Waste Confidence Rule, the Commission determined that spent fuel can be safely stored on site for at least 30 years beyond the licensed operating life, which may include the term of a renewed license. At or before the end of that period, the fuel would be moved to a permanent repository. The GEIS, NUREG-1437, is based upon the assumption that storage of the spent fuel on site is not permanent. This supplement to the GEIS for Millstone Units 2 and 3 is also based on the same assumption.*

Alternative methods exist, other than storage in the spent fuel pools, for safe interim storage of high-level waste onsite. Licensees can and have taken advantage of these alternative dry storage options. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.

Comment: Section 2.1.4 Radioactive Waste Management Systems and Effluent Control Systems Page 2-8, lines 27-29 Draft GEIS Supplement 22 Statement Millstone is in the process of obtaining a permit to construct a dry fuel storage area for additional spent fuel assemblies. Dominion Comment - Millstone has obtained the permit described above. It is suggested that

"is in the process of obtaining a permit to construct" be changed to "has constructed" so the sentence reads: "Millstone has constructed a dry fuel storage area for additional spent fuel assemblies." (MPS-47-4)

Comment: Section 2.1.4.3 Solid Waste Processing Page 2-12, line 3 Draft GEIS Supplement 22 Statement...volume was 24.3 m^3 (858 ft^3)... Dominion Comment - Change to: "... volume was 243 m^3 (8580 ft^3)... (MPS-47-5)

Comment: Section 2.1.5 Nonradioactive Waste Systems Page 2-12, Lines 11-12 Draft GEIS Supplement 22 Statement Dominion has petitioned the CTDEP to be classified as a small-quantity generator because of a reduction in the amount of waste generated at Millstone. Dominion Comment - Although Millstone generates hazardous waste at the rate of a small-quantity generator, the decision was made not to pursue classification as a small-quantity generator, in order to maintain flexibility in storage and shipping. It is suggested that this sentence be deleted. (MPS-47-6)

Comment: Section 2.1.5 Nonradioactive Waste Systems Page 2-12, Lines 17-19 Draft GEIS Supplement 22 Statement Common types of hazardous waste generated at Millstone are lead acid sludges and batteries, solvent rags, and sawdust contaminated with chemicals regulated under RCRA. Dominion Comment - Lead acid batteries and sawdust contaminated with chemicals are classified as Connecticut-regulated wastes. This sentence should be changed to the following: "Common types of hazardous waste generated at Millstone are aerosol cans, paint-related waste materials, and solvent rags." (MPS-47-7)

Response: The comments by Dominion concern details of Millstone's waste management systems and processes. The NRC staff reviewed and accepted Dominion's comments; Sections 2.1.4 and 2.1.5 were modified to reflect the comments.

Comment: Do you believe that true costs are considered when assessments, such as the one you are about to read of, are done? Pollution from mining, transportation, processing, waste products and their disposal as well as the health and environmental costs, etc. make up those unaccounted for costs. (MPS-80-1)

Response: *The comment relates to human health impacts from the fuel cycle. Chapter 6 of this SEIS addresses the environmental impacts of the uranium fuel cycle and solid-waste management during the license renewal term, which are listed in Table B-1 of Title 10 of the Code of Federal Regulations (CFR) Part 51, Subpart A, Appendix B, and are applicable to Millstone Power Station Units 2 and 3 (Millstone). The generic potential impacts of the radiological and nonradiological environmental impacts of the uranium fuel cycle and transportation of nuclear fuel and wastes are described in detail in the GEIS based, in part, on*

the generic impacts codified in 10 CFR 51.51(b), Table S-3, "Table of Uranium Fuel Cycle Environmental Data," and in 10 CFR 51.52(c), Table S-4, "Environmental Impact of Transportation of Fuel and Waste to and from One Light-Water-Cooled Nuclear Power Reactor." The staff also addresses the impacts from radon-222 and technetium-99 in the GEIS. The comment provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.

11. Comments Concerning Alternatives

Comment: The question of alternatives also bothers me. You seemed to set your priorities in the wrong direction. I may be wrong about that, but you mentioned first coal, gas, and all kinds of alternatives, which are not generally considered good alternatives.

You just barely touched on solar and wind, which, along with environmental conservation and energy efficiency, conservation and energy efficiency you didn't mention at all. And I wonder if that's in your -- was in your purview. (MPS-5-4)

Comment: ... where all the money and subsidies, our taxpayer subsidies -- including the Price Anderson Act -- will be going to these new plants, costing billions and billions of dollars, while that money, if we needed that much subsidy -- if we had that much subsidy going to clean energy, energy efficiency, solar, and wind, we wouldn't need a single oil plant or a nuclear plant. (MPS-5-6)

Comment: In addition, we find the centralization that this kind of energy represents to be unwise. Our centralized grid is brittle, vulnerable to blackouts and terrorism. Decentralized energy substations, using renewable energy, would help to make us safer. (MPS-11-4)

Comment: Our reading told us -- tells us -- and this I know is not -- not universally believed, but we believed it, and we studied this in depth. In combination with energy efficiency, methods of generating energy efficiently, and shifting to renewable sources, this can be done. It's not a myth. And other countries are already doing it.

So to relicense nuclear plants for another 20 years is to pull the rug out of initiatives to develop cost-effective renewable generation of energy, combined with change of policy for wise use. To pull the rug out -- this is to move the energy policy of the nation in the wrong direction. So we urge you: don't do this. (MPS-11-7)

Comment: Nuclear energy is expensive when the hidden costs are factored in. Expanding the use of renewable energy, combined with the creative design of wise years, is really the only way to go in the long run. (MPS-11-10)

Comment: Aside from my own, the engineers state that most renewable energy sources are expensive, unpredictable, and dangerous to the environment. Nuclear energy could be vital to addressing these environmental issues without creating others. (MPS-14-3)

Comment: There are alternative ways to generate electricity and Connecticut should be looking for those ways. In these uncertain times decisions can't always be about profits & shareholders. It must be more about safety and alternative ways to generate clean and efficient energy. (MPS-30-4)

Comment: If we really want to cut CO2 emissions we need to look at the big picture, wind, solar, geothermal, bio-diesel, methane from dumps used as a fuel source, forest /conservation, green building, etc. If we take a nuclear power plant off line, clearly any wind generated power will not make a dent in the CO2 until there is more electricity produced from the wind source than by the nuclear power plant ... and don't forget those hidden costs. (MPS-80-2)

Comment: The Connecticut, United States, and worldwide community demands are clear....it's time to phase out nuclear power. (MPS-81-1)

Comment: Can I interest you in something related to hydrogen fuel cells? (hydrogen produce from clean sources not nuclear) (MPS-81-6)

Response: *The comments relate to the environmental impact of alternatives. The SEIS for the Millstone Power Station presents the staff's analysis of the environmental impacts of the proposed action, i.e., renewal of the operating licenses for Millstone, and of reasonable alternatives. These impacts are presented in discrete resource areas so that environmental impacts can be compared between the proposed action and reasonable alternatives. The SEIS is not an evaluation of the best mix of energy generation sources for the Connecticut area or a determination regarding which mix would result in the least overall environmental impacts. The decisions regarding which generation sources to deploy are made by the licensee and State energy planning agencies, not the NRC. The viabilities of the various alternatives to renewal of the operating licenses for Millstone are pertinent to the discussion of alternatives to the extent that an alternative is considered reasonable. However, the staff recognizes that although some alternative energy sources, when considered by themselves, may not be viable replacements for Millstone, these alternatives could be part of a combination of generation sources that could replace Millstone. The many possible combinations could include combined-cycle gas-fired plants, clean-coal plants, renewable energy sources such as wind and solar power, and energy conservation. A likely combination of alternatives that includes 500 MW(e) gained from additional demand-side management measures was chosen for discussion in Section 8.2.6 of the SEIS. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.*

Comment: I have to point out one blatant misstatement of fact before I step away. And that appears at page 843, where the NRC is arguing against wind power, against solar power, against conversion to same methods and has this to say about replacement power. This is section 8.2.4. This is talking about alternatives, "If available, purchased power from other sources could obviate the need to renew the Millstone OLs, operating licenses. It is unlikely, however, that sufficient baseload from power supply would be available to replace the Millstone capacity. Connecticut is a net importer of power." That is simply not true.

You don't attribute that statement to any source, but we would recommend that you go to the Web site of the Connecticut Siting Council. That is a State agency. Its responsibility under law is to create projections of electrical need and current generating capacity.

If you go to their Web site, you will see that there is not only no need to import power to Connecticut; power is exported. We have excess power. And even if we took out Unit 2 and Unit 3 from Millstone, we would continue to have excess power, even at times of peak demand. (MPS-23-12)

Response: *The statement in the Draft SEIS describing Connecticut as a net importer of energy is from the Dominion Environmental Report and is cited as "Dominion 2004" on the next line of the paragraph. The Connecticut Siting Council annual 10-year forecast shows that imported power is part of the energy supply mix for Connecticut. The text was revised to remove discussion of whether Connecticut is an importer or exporter of energy.*

Comment: Section 8.1 No-Action Alternative Page 8-4, Lines 26-27 Draft GEIS Supplement 22 Statement - When the plant stops operating, there will be a reduction in use of groundwater. Dominion Comment - The station itself does not use groundwater. The only use of groundwater is that used by the town of Waterford for seasonal irrigation of the ball fields. Therefore, closure of the plants would not necessarily result in a reduction in the use of groundwater. (MPS-47-53)

Comment: Section 8.2.5.10 Utility-Sponsored Conservation Page 8-50, Line 18 Draft GEIS Supplement 22 Statement - Dominion participates in State-wide residential, commercial, and industrial programs to reduce... Dominion Comment - Dominion is not the local distributor of electricity. It is suggested that "Dominion participates in" be replaced with "Connecticut has" so the sentence reads: "Connecticut has State-wide residential, commercial, and industrial programs to reduce..." (MPS-47-54)

Response: *The comments related to alternatives by Dominion were reviewed and accepted by the NRC staff. The text in Sections 8.1 and 8.2.5.10 of the SEIS have been revised to reflect the comments.*

Comment: In their comparisons of alternative methods of electricity production, I could not find a chart showing total dollar costs for production by the various alternative means. When considering environmental costs, I feel that nuclear waste and the production of depleted uranium are the most undesirable. The cost of electricity keeps rising for Connecticut residents. As a citizen of this state I would prefer to pay more if the power came from more environmentally friendly method of generation. (MPS-48-1)

Comment: Dominion has not provided a comparative analysis and assessment of life cycle energy consumption to determine that re-licensing of Millstone is the preferred option. Nor, has Dominion considered cumulative alternatives (i.e., energy sources) to meet the current and future energy demands. (MPS-49-1)

Comment: Also, the State of Connecticut has enacted legislation that mandates a move to Clean, Renewable energy (referred to as Class I renewable). This plant does not meet this criteria. The denial of this extension would go a long way to improving the health and environment of Ct as well as exepiting [sic] the move to Clean Energy. (MPS-62-3)

Response: *The comments relate to possible energy alternatives. Impacts from reasonable alternatives for Millstone are evaluated in Section 8.0 of this SEIS. NRC's responsibility is to ensure the safe operation of nuclear power plants and not to formulate energy policy or encourage or discourage the development of specific alternative power generation. The staff's evaluation of alternatives is limited to an assessment of their environmental impacts. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.*

Comment: The Bureau has considered the alternatives presented in the Draft EIS and is concerned that any fossil-fueled alternative electricity supply will have negative air quality impacts as compared to re-licensing the Millstone units.

If the license for the Millstone units is not renewed, additional fossil-fueled generation would likely be necessary to meet the state demand for electricity, as an alternative consisting only of demand reduction, energy efficiency and alternative energy sources is not feasible in the given timeframe. Moreover, the Connecticut Energy Advisory Board's 2004 energy plan specifically identified the inadequacy of the State's transmission infrastructure. Failure to re-license units 2 and 3 will further exacerbate this problem. The Bureau supports the use of clean alternative energy sources and measures that reduce electricity demand. However, the Bureau recognizes that such measures require immediate and substantial changes in behavior with regard to energy use, a substantial investment in low- and no-emitting resources and large-

scale implementation of energy conservation and load reduction measures by residential and industrial energy users. Such changes can only occur over a longer timeframe than that allowed by denial of the license renewal.

The air quality impact of replacing the electricity generated by the Millstone units with electricity generation by large-scale fossil-fueled electric generators is substantial. As the Draft EIS identifies, emissions of nitrogen oxides (NOx), sulfur oxides, carbon monoxide, particulate matter and hazardous air pollutants would increase. Increased NOx emissions are a particular concern to the Bureau since reductions in emissions of ozone precursors are of immediate importance to Connecticut's strategy to attain and maintain the national ambient air quality standards (NAAQS) for ozone. In order to attain the new 8-hour ozone NAAQS statewide by 2010, as required by the U.S. Environmental Protection Agency (EPA), Connecticut is now in the process of identifying additional reductions that may be obtained from a variety of sources in the state. Furthermore, the same assessment is underway for fine particulate matter, in order to comply with EPA's designations under the NAAQS for particulate matter less than 2.5 microns in diameter. (MPS-77-1)

Response: *The comment is related to a concern about the impact to air quality if a fossil-fueled electrical generation alternative was selected. Impacts from reasonable alternatives for Millstone license renewal including coal and natural gas-fired electrical generation alternatives are evaluated in Sections 8.2.1 and 8.2.2. The comment provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.*

12. Comments Concerning Postulated Accidents

Comment: Price Anderson -- I don't know what the fund is now, but it's probably around $9 billion. But it's been estimated that an accident on the scale of the Chernobyl accident, or something like it, probably runs into $3- or $4- or $500 billion. And so there's no cost-benefit there, and that's not even mentioned in this impact statement. (MPS-4-4)

Response: *The comment relates to the Severe Accident Mitigation Alternatives (SAMA) cost-benefit analyses in Chapter 5 of the SEIS. As discussed in Chapter 5, Dominion performed these analyses in accordance with NRC's guidelines for performing cost-benefit analyses, NUREG/BR-0184, "Regulatory Analysis Technical Evaluation Handbook." The funds available under the Price Anderson Act are not included in SAMA cost-benefit analyses. The comment provides no significant new information; therefore, the comment was not evaluated further. No revision was made to the text of the EIS.*

Comment: I want to ask you whether you include what the administration, the present administration of our country, is constantly beating on, and that is the question of sabotage and

terrorism, and now the question of natural disasters by the way they're -- the disaster in the Indian Ocean included a nuclear plant. And have you considered all these aspects in your report? (MPS-5-4)

Comment: I'm concerned because the entire plant is built on an ancient earthquake fault. The probabilities of movement, seismic movement, are there. How could you possibly calculate that that was of low impact? (MPS-6-1)

Comment: You talk about, you know, tsunamis being of a low, you know, statistical value. However, earthquakes are not of low statistical value. That can happen at any time. But, you know, these acts of nature are something that we don't have any control over.

If we were to experience what was just experienced a couple of weeks ago in the Asian countries, how in the world are we going to handle something like that? That is going to -- you know, the earth is going to open up. Those buildings that are moved we're going to have leakage of any containment that's inside of the buildings. (MPS-6-2)

Comment: It would be a sequential event. We would have an earthquake, which would be followed by flooding, which would be followed by interruption of the structures. We'd have openings for that radioactive element to be exposed into the environment. How can that be put down as, you know, just a small thing of value, or small impact? (MPS-6-3)

Comment: We are also worried about a nuclear accident. Old machines are fallible, as are the human beings who run them. We only need to look at the Davis-Besse in Ohio to understand the potential of what may occur without even the awareness of nuclear plant operators. (MPS-11-3)

Comment: I noticed that you talk about things that could happen with the reactor, but you don't mention any fires in the spent fuel pool or any act by a malicious individual on the spent fuel pool.

And those are accidents that would still be possible with Millstone in the license renewal period, whether it was in the wet storage of the proposed dry cask storage. (MPS-18-2)

Comment: Aside from the malicious thing I brought up -- I'm sorry I did at this point -- I still feel that the spent fuel pool having an accident on its own without anybody provoking it is still not a severe accident in your report. And so I have a contention with that. (MPS-18-3)

Comment: My point is you are adding 20 more years of spent fuel to this mix of what you have already got. So it is going to increase the risk. (MPS-18-4)

Response: *The comments relate to the range of accidents evaluated in Chapter 5 and Appendices H and I of the SEIS. Chapter 5 and Appendices H and I discuss the Probabilistic Risk Assessment (PRA) and external event analyses that formed the bases of Dominion's SAMA analyses for Millstone. Seismic events were included in the evaluation of external events. Component failures and human errors were evaluated in the PRA. Event sequences leading to damage to the spent fuel pool were not addressed in the PRA because studies have shown that the risk to the public from spent fuel pool accidents is much less than from reactor core damage accidents.*

Sabotage and terrorist events are not evaluated in the PRA because of the large uncertainities in the probability of occurrence. Also, sabotage and terrorism are outside the scope of the license renewal process. The comments provide no significant new information; therefore, the comments were not evaluated further. No revision was made to the text of the SEIS.

Comment: In the event of a severe accident at Millstone the probability of weighted consequences of a release to groundwater is stated to be small (Supplement 22, page 5-4). However, there is a potential for radioactive fallout directly onto the surface water bodies that serve as the Fishers Island water supply. Radiological monitoring and the provision of an alternative public water supply for these Suffolk County residents are not addressed in the document.

Dominion estimates that the dose to the population within 50 miles of the Millstone site from severe accidents to be between 12.8 and 17.4 person-rem. What is the expected dose to county residents living on Fishers Island and the North Fork that are considerably closer proximity and what health risks are posed by this exposure? (MPS-52-6)

Response: *Groundwater is the normal public water supply for Fishers Island; however, there is a pond on the island that is available as a supplemental public water supply. It is sometimes used when the number of visitors to the island increases, such as during the summer. The MACCS2 code does have the capability to calculate population doses from drinking water from surface water bodies contaminated by direct deposition of radionuclides during a severe accident. Dominion did not perform such calculations for the SAMA analyses, and the staff did not request such calculations. In calculations for other plants, population doses from the direct deposition on the surface water – drinking water pathway were found to be insignificant compared to the inhalation and direct deposition – groundshine dose pathways. Also, emergency planning decisionmakers could interdict the use of water from this pond and provide safe drinking water supplies from outside the affected area after a severe accident.*

Comment: Appendix H Page H-1, Lines 17-18 Draft GEIS Supplement 22 Statement - ... or were related to a reactor coolant pump (RCP) seal loss of coolant accident (LOCA). Dominion Comment - "loss of coolant accident (LOCA)" should be replaced with "dependency on charging

pumps" so the sentence reads: "....or were related to a reactor coolant pump (RCP) seal dependency on charging pumps." (MPS-47-55)

Response: *The comment by Dominion provides a more accurate description of Millstone's safety systems. The staff reviewed and accepted the comment. Appendix H of the SEIS has been revised based on the comment.*

13. Comments Concerning Issues Outside the Scope of the Environmental Review for License Renewal: Emergency Response and Preparedness, Safeguards and Security, Operational Safety, Aging Management, Need for Power, and Regulatory History

Emergency Response and Preparedness

Comment: And the other question was evacuation. I always laugh at evacuation, because as far as I know, there has never been -- in a nuclear plant in this country, there has never been a full-scale drill as to what evacuation would -- how it would occur. I know they have had drills with the first responders and that type of thing, but the public, who are the people who are supposed to be protected by this evacuation plan, have never been involved in an evacuation plan. (MPS-4-5)

Comment: I want to ask you whether you include what the administration, the present administration of our country, is constantly beating on, and that is the question of sabotage and terrorism, and now the question of natural disasters by the way they're -- the disaster in the Indian Ocean included a nuclear plant. And have you considered all these aspects in your report? (MPS-5-5)

Comment: I object that the GEIS contains no evacuation plan for the residents, or no reference to evacuation, for residents of Southold town or elsewhere on eastern Long Island.

The geography of Long Island creates an extremely dangerous situation for those residents. I don't know if you know anything about Long Island, but we can't get off of Long Island on your average work day in an organized fashion. You try and get on the Long Island Expressway and head to Manhattan between the hours of 6:00 and 8:00, and you're going to be sitting in a parking lot.

Throw a little release of radioactive material in that parking lot, and now it turns to a mess of cars tailgating and creating incredible accidents and anxiety among the people. At the very end of a narrow strip of land there is only one direction to travel in the case of an emergency. I'm just speaking specifically about the town of Southold and the North Fork.

At the end of this very strip of land, one direction to travel in the case of an emergency, and that direction is west. (MPS-8-4)

Comment: I am requesting that a fully-funded Federal emergency management study of Southold town's unique geographic challenges, and how this relates to the threat of a radioactive release at the Millstone power plant, be undertaken as part of this GEIS, and that the GEIS be considered incomplete without it. (MPS-8-5)

Comment: And in the GAO, which, mind you, is a federally -- is a Federal agency, the GAO reports -- this is a compliance review matrix for Fisher's Island, which is a little teeny island out in Fisher's Island Sound that happens to fall within my jurisdiction.

Here are the requirements: identifies local, Federal, and private sector organizations that are part of the overall responsible organization. This is in response to the possibility of an evacuation for the residents of my community. Requirement met or not met? Not met. These agencies are not clearly identified.

Functions and responsibilities for major elements in emergency response specified for each organization and key individuals by title. Not met. The plan does not cite the legal basis for the key elements in emergency response.

This goes on and on and on as to the inadequacies that exist within the emergency management plan for a small island of 275 people that I represent. And the GAO says it's inadequate. Your EIS says you don't have to address it. Where do we meet on this? Who has to address it, then? The Federal Government said it's inadequate, and Dominion and the NRC say it's all right, it's an ongoing process. (MPS-8-8)

Comment: The NFEC membership is very concerned that our location, some 10 to 11 miles south of this facility, will place in grave danger in the event of an unplanned evacuation.

Any severe accident evaluation, or evacuation plan which does not include the North Fork of Long Island, is deficient. (MPS-9-2)

Comment: As stated before, some North Fork residents live as close as 12 miles to the Millstone reactors, yet there are no plans in place to ensure the safety of these residents if there were an incident at the Millstone facility.

Because the North Fork is essentially a peninsula surrounded by water on three sides, we have only one direction to evacuate. That's west. Residents of Orient -- and I have a map, I'm going

to submit it probably later on for -- for the record. Residents of Orient have only one road leading west until Greenport. There are only two roads from Greenport to Mattatuck, and three from Mattatuck to River Head.

In the event of an emergency, evacuation of the 22,000 year-round residents and 30,000 summer residents would be virtually impossible, not to mention the hundreds of thousands of Long Island residents who live to the west and who would also be evacuated. Because evacuation of Long Island is impossible, the Shoreham nuclear power plant was shut down. Many of us live closer to Millstone than to Shoreham. (MPS-9-3)

Comment: Currently, there is no plan -- plans in place to notify Long Island in the event of a nuclear accident. Legislation should mandate a 50-mile radius notification system.

Lack of an evacuation plan. And I'm not saying anything here that you haven't heard already, but you have to understand the importance of this. So there is no evacuation plan that will ever safely evacuate Long Island in the event of a nuclear accident. (MPS-10-2)

Comment: Finally, I would ask that the comments that were made at the beginning of the meeting regarding the exemption of the emergency preparedness and the security issues associated with the plant that are not included in this be addressed as to the reason why, in the abstract, ... (MPS-13-3)

Comment: I respectfully submit that the abstract or some portion of the report address the absence of the security and the emergency preparedness elements of environmental issues from the report so the public is assured that something is going on and that it is just not being addressed in this report. (MPS-24-4)

Comment: The draft Environmental Impact Statement (EIS) being prepared by the Nuclear Regulatory Commission (NRC) with respect to the license renewal does not address some highly-related issues such as the Evacuation Plan. The current evacuation zone does not include the effect of a major release and its effect on Connecticut and its cities such as New Haven, only about 40 miles from the plant, nor does it consider the proximity of Long Island only a few miles away across the Sound where evacuation has been shown to be impossible. (MPS-28-3)

Comment: Until Long Island has and evaluation plan we should not have nuclear power plants operating within 100 miles of us. As I have learned, it's not if there will be an accident it's just when will it be. 911 should have taught us all that we are so vulnerable. (MPS-31-1)
Comment: I wish to share with you my serious concerns that Millstone's operation poses a serious risk to the residents of the North Fork of Long Island. Without an emergency plan in

place that expands the current 10 mile radius to a 50 mile radius including the North and South Forks, there should be no consideration of renewing Millstone's contract. In the event of an accident or terrorist attack, Long Island is currently extremely vulnerable. We must ensure that safety of the residents of Eastern Long Island. Therefore, I strongly oppose renewing the contract of The Millstone Power Station. (MPS-32-1)

Comment: However, should the license be renewed, I believe it is imperative that the NCR expand the scope of its evacuation plant to a 50-mile radius to include all of Long Island. (MPS-35-2)

Comment: I am writing to voice my strong objection to the Millstone license renewal without making a plan for the evacuation of Long Island's north shore—within the 10 mile radius of Millstone This is unacceptable. (MPS-36-1)

Comment: However, should the license be renewed, I believe it is imperative that the NCR [sic] expand the scope of its evacuation plant to a 50-mile radius to include all of Long Island. (MPS-37-2)

Comment: It is my understanding that the Nuclear Commission in the State of Connecticut have no plants [sic] for notification of residents who reside in a ten to fifty mile radius in the event of a nuclear malfunction. A plan for evacuation of this area is vital. Without a plan for viable evacuation, the plant should be shut down. (MPS-38-2)

Comment: We are very concerned that there is no apparant [sic] notification system in place - we site the recent fire, and site evacuation in Jan. 2005. There are no policies in places to notify neighboring states, this is a huge concern of ours. As residents of New Jersey, we would want to be fully advised, and alerted to when public meetings are being held to discuss/debate the renewal of the license. (MPS-40-2)

Comment: In the event of an emergency, Fishers Island's residents are to be evacuated to either New London or Stonington Harbor and be bused north to Windham, CT. What is the fate of researchers and operations at Plum Island in the event of a severe accident at Millstone? A 50-mile Ingestion Planning Zone is identified in the State of Connecticut's Radiological Emergency Plan in the event that a nuclear plant release is carried beyond 10 miles. This EPZ encompasses virtually all of Suffolk County east of the William Floyd Parkway in Brookhaven Township. Although ingestion suggests an assessment of food and drinking water, a release carried southward to Suffolk County is likely require additional public protective actions, up to and including evacuation. This had been deemed infeasible during the public discourse concerning the Shoreham nuclear plant due to the lack of adequate transportation infrastructures. Since that era, no new major east-west transportation facilities have been constructed, and there has been a significant increase in the population of eastern Suffolk

County. Evacuation of eastern Suffolk County remains an infeasible scenario, a fact we consider to be a major factor impeding renewal of Millstone's operating licenses. (MPS-52-3)

Comment: There are no emergency plans in place for Long Island in the event of an incident or accident at the facility. The DEIS ignores the safety threats to Long Island residents and the environmental impacts of the aging reactors. (MPS-53-2)

Comment: Nuclear energy has its attributes but plants should be located in sensible areas where evacuation in case of emergency is possible. (MPS-55-1)

Comment: There is no plan in existance for a safe evacuation from Long Island in spite of the fact that it is 11 miles away. Shoreham was shut down for just that reason. (MPS-56-4)

Comment: The Millstone Draft Environmental Impact Statement is completely silent on impacts to Long Island. There are absolutely no evacuation plans in place for Long Island. (MPS-57-2)

Comment: If renewed, these reactors will be up and running for another 20 years, yet there are no emergency plans in place for eastern Long Island in the event of an incident or accident at the facility. The Millstone DEIS is complete silent on impacts to Long Island. Shoreham did not come on line because we couldn't put an evacuation plan in place. (MPS-58-2)

Comment: If renewed, these reactors will be up and running for another 20 years, yet there are no emergency plans in place for eastern Long Island in the event of an incident or accident at the facility. The Millstone DEIS is complete silent on impacts to Long Island. Shoreham did not come on line because we couldn't put an evacuation plan in place. (MPS-59-2)

Comment: As a resident of the North Fork of Long Island it is unacceptable to me that Millstone be allowed to operate without a workable evacuation plan in place for my township. (MPS-60-2)

Comment: There is no way we can be safely evacuated, should there be a problem, the communications of warnings between the states seem to be nearly non-existent (MPS-63-2)

Comment: There is no evacuation plan for eastern Long Island, (MPS-64-2)

Comment: The Millstone draft Environmental Impact Statement is completely silent on impacts to Long Island. This gross omission by the NRC is reason to deny re licensing on this basis alone. Meaning if and when there is a nuclear event (and there was one on January 14, 2005), they do not have to notify Long Island who is just 10 miles south of the Millstone along the Long

Island Sound. Shoreham did not come on line because we couldn't put an evacuation plan in place. Millstone is our Shoreham!! (MPS-66-2)

Comment: They do not have an emergencey [sic] evacuation plan for where I live on Long Island. (MPS-67-2)

Comment: If renewed, these reactors will be up and running for another 20 years, yet there are no emergency plans in place for eastern Long Island in the event of an incident or accident at the facility. I also understand that the DEIS for this relicensing ignores the safety threats to Long Island, New York residents and the environmental impacts of the aging reactors.

The Millstone DEIS is completely silent on impacts to Long Island. A nuclear power plant in Shoreham, Long Island did not come on line because an evacuation plan could not be put in place, particularly for Eastern Long Island. (MPS-68-1)

Comment: I live less than 25 miles from Millstone, in an area that is downwind from the plant several months a year. There is no question my family would be directly impacted in the event of any accident or a terrorist attack. (MPS-70-1)

Comment: This safety issue falls squarely under the topic of severe accident mitigation, which the DEIS is mandated to analyze in detail. However, completely omitted from all review was the topic of an evacuation plan for the residents of Southold Town or elsewhere on eastern Long Island. The reason for such omission is simple; no such plan exists, nor has one ever been studied or even considered. The geography of Long Island creates an extremely dangerous situation for those residents in the case of a severe accident at Millstone. At the very end of a narrow strip of land, there is only one direction for these residents to travel in the case of an emergency -West. There is, in some cases, only one road on which to travel -New York State Route 25 in the event of a Millstone-induced emergency, Southold residents will be unaccounted for by the NRC. By the time Southold residents evacuate and reach the mainland of Long Island, we will be lined up on the Long Island Expressway behind the literally millions of other Long Island residents who have the same one and only direction to travel. This is a "natural recipe for a manmade disaster" that must be avoided.

To the extent that the drafters of DEIS seek to avoid creating an evacuation plan for the Town of Southold and eastern Long Island on the purported grounds that federal regulations only require such plans to do so within a 10 mile radius, they should and must consider the extreme circumstances that are present. The North Fork of Long Island is directly across the Long Island Sound. Strong prevailing winds blow across the water directly to our shores. We are the first affected residents to the south of this plant. To say that we are beyond the affected area is just wrong and cannot be the basis for a proper EIS. With that knowledge, I believe it is

imperative that the NRC expand the scope of its evacuation planning to include the residents of the Town of Southold and other affected areas of eastern Long Island. (MPS-72-2)

Comment: Residents, civic and environmental groups have joined many elected officials from the East End and across Long Island and called for the extension of the emergency planning zone from the current 10-miles radius to a 50 miles mile radius. By doing so, emergency planning for the North Fork would be required.

Because the North Fork is essentially a peninsula, surrounded by water on three sides, we have only one direction to evacuate west. Residents in Orient only have one Road heading west until Greenport. There are only two roads from Greenport to Mattituck, three from Mattituck to Riverhead. In the event of an emergency, evacuation of the 20,000 year round North Fork residents, or 30,000 summer residents would be virtually impossible not to mentions the hundreds of thousands of Long Island residents to the west. Because evacuation of Long Island is impossible, the Shoreham Nuclear Plant was shut down. Many of us live closer to Millstone than to Shoreham. (MPS-73-3)

Comment: I am saying NO to this proposed Millstone license renewal. One can hardly get off Long Island now without there being a catastrophe! This renewal would put too many lives here on Long Island in danger should anything happen at the Millstone Nuclear plant...There is no feasable escape route possible for so many Long Island inhabitants. A NUCLEAR LEAK OR ACCIDENT WOULD BE WORSE THAN A TSUNAMI HITTING LONG ISLAND!!! NO, NO, NO TO THIS RENEWAL! (MPS-76-1)

Comment: If an accident happened we could not evacuate the population (we can't even get home during rush hour). We have no way to deal with the contamination should an accident occur. (MPS-81-2)

Response: *The comments are related to emergency preparedness issues. The staff considered the need for a review of emergency planning issues in the context of license renewal during its rulemaking proceedings on 10 CFR Part 54, which included public notice and comment. As discussed in the Statement of Considerations for the rulemaking (56 FR 64966), the programs for emergency preparedness at nuclear plants apply to all nuclear power plant licensees and require the specified levels of protection from each licensee regardless of plant design, construction, or license date. The requirements of 10 CFR 50.47 and Appendix E to 10 CFR Part 50 are independent of the renewal of the operating license and will continue to apply during the license renewal term.*

Through its standards and required exercises, the Commission ensures that existing plans are adequate throughout the life of any plant, even in the face of changing demographics and other

site-related factors. Therefore, the Commission has determined that there is no need for a review of emergency planning issues in the context of license renewal. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no change to the text of the SEIS.

Safeguards and Security

Comment: The nuclear power plants are targets for terrorism, and we haven't even touched on that. Okay? The terrorists certainly know where all of our weak spots are. And a nuclear power plant just screams. You just may as well leave the keys in the car with the lights on and just let it happen, because that is what -- you can talk about all of the reinforcing, and you can talk about all that good stuff, but the reality is it doesn't work. And for anyone to try to make us think it will is also very disingenuous. (MPS-10-4)

Comment: And let me just say it only takes one catastrophic event, whether by nuclear accident or terrorist attack, to devastate this region. (MPS-10-5)

Comment: PACE -- People's Action for Clean Energy -- a Connecticut State organization since 1974, representing 2,400 constituent households, strongly and adamantly opposes the relicensing of Millstone. Our Board of Directors, members, and supporters are extremely concerned about terrorism. We've heard this before.

The spent fuel pools at nuclear plants are not adequately protected. In fact, we view nuclear power plants as weapons of mass destruction only waiting for terrorists to detonate them. (MPS-11-1)

Comment: Lastly, continuous operation of nuclear power plants creates more waste. Even if we send waste to Yucca Mountain, a seismic area, more waste will be created in Connecticut that will remain to hurt us or to tempt terrorists. (MPS-11-5)

Comment: ... it is an environmental impact if a terrorist attack, for example, releases -- and I have a big problem. That is my principal concern for coming tonight. The gentleman up there said you cannot quantify it, and that is correct.

But I think that the way I would quantify it is very high. You quantify it looking pre-9/11 in the report. And you use the word "small" and you define small. I think that is a big error.

I realize that the NRC is addressing it, but I think that it has to be in an environmental impact statement because it is the biggest threat to the environment, far greater than any of these SAMAs. (MPS-19-1)

Comment: I have a big problem with the Commission's standpoint that the staff basically at this level isn't going to deal with the clear terrorist threat to the nuclear power plants in the country. And so my comments are generic about that. And they're specific about the threat to Millstone. (MPS-19-3)

Comment: My concerns with the EIS are primarily section 5 and what I said earlier. It's complete ludicrousy to just ignore and quantify it as small and SAMA as a terrorist attack. (MPS-19-4)

Comment: Terrorism is certainly one major omission. (MPS-23-2)

Comment: ... there is palpable concern within this community regarding the security of the nuclear power installation, not so much the dome, more the spent fuel. (MPS-24-2)

Comment: I respectfully submit that the abstract or some portion of the report address the absence of the security and the emergency preparedness elements of environmental issues from the report so the public is assured that something is going on and that it is just not being addressed in this report. (MPS-24-3)

Comment: I did want to support the objections that people have made or their concerns regarding security. (MPS-25-1)

Comment: This is doubly alarming now that we face likely threats of terrorism on our own soil. Millstone is essentially a Weapon of Mass Destruction waiting to be detonated! (MPS-26-2)

Comment: Terrorism and sabotage are not included in the draft EIS even though these plants can be prime targets with their highly-radioactive spent fuel stored in unprotected pools or, as approved, in dry cask storage on the reactor site. (MPS-28-4)

Comment: I have grave concerns about the safety of this power plant. In the event of a terrorist attack, the impact to the tri state area would be devastating. I would hate to have something occur as it relates to terrorism and this Power Plants, to find that my concerns are correct. (MPS-30-2)

Comment: The nuclear site also makes us a target for terrorist activity, which is certainly a concern in today's world. (MPS-65-4)

Comment: It is common knowledge that nuclear power plants and the adjacent spent fuel pools are vulnerable to terrorist attack. In addition to living in close proximity to Millstone, North Fork residents live very close to other potential terrorist targets including the Plum Island Animal Disease Center (PIADC). If there were an incident at the Millstone Facility, there are no

emergency plans in place for PIADC. The NRC would be negligent if these facts were not considered in your deliberations. (MPS-73-4)

Comment: And now we have to spend money on terrorist precautions. (If nuclear power was so safe, why do we have to worry about terrorists attacks? I've never heard of a terrorist attack on a solar panel). (MPS-81-5)

Comment: In 2001, terrorists who had targeted nuclear power plants hijacked a passenger jet and flew over the Indian Point Nuclear Power Plant 29 miles of New York City before slamming into the World Trade Center. The U.S. Department of Homeland Security, subsequently created, designated the Millstone Nuclear Power Plant a terrorist's target of choice. (MPS-82-25)

Comment: In 2004, Dominion rejected the U.S. Department of Homeland Security's offer of a free security enhancement to protect the three Millstone intake structures from terrorist attack. (MPS-82-29)

Response: *The comments are noted. In a recent decision in another license renewal proceeding, the Commission discussed the terrorism and sabotage issues raised in the comments. See Duke Energy Corp. (McGuire Nuclear Station, Units 1 & 2; Catawba Nuclear Station, Units 1 & 2), CLI-02-26, 56 NRC 358 (2002). In that decision, the Commission found that NEPA imposes no legal duty on the NRC to consider intentional malevolent acts on a case-by-case basis in conjunction with commercial power reactor license renewal applications. The Commission concluded that the "environmental" effect caused by third-party miscreants is simply too far removed from the natural or expected consequences of agency action to require a study under NEPA.*

The Commission has also indicated that terrorism differs from matters ordinarily considered in an EIS. An EIS may discuss, for example, such matters as likely effects on local water, air quality, vegetation, wildlife, culture, and socioeconomic concerns. These effects are reasonably certain; an EIS can quantify them to a fair degree of precision. Terrorism, by contrast, comes in innumerable forms and at unexpected times and places. It is decidedly not predictable, and it is not a natural or inevitable by-product of the granting of an application. For these reasons, the Commission has stated that an EIS is not an appropriate format in which to address the challenges of terrorism.

In its recent license renewal decision, the Commission also noted that, particularly in the case of a license renewal application, where reactor operation will continue for many years regardless of the Commission's ultimate decision, it is sensible not to devote resources to the likely impact of terrorism during the license renewal period, but instead to concentrate on how

to prevent a terrorist attack in the near term at the already licensed facilities. Finally, the Commission determined that there appears to be little practical benefit in conducting a license renewal terrorism review.

Nevertheless, the Commission did indicate that its decision not to use NEPA as a vehicle for a terrorism review does not mean that it is ignoring the issue. Rather, the Commission is closely examining the current security and protective framework and already has ordered interim improvements at licensed nuclear facilities, including reactors. The Commission expects further improvements as the internal comprehensive review moves forward. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no change to the text of the SEIS.

Operational Safety

Comment: My father was a pipefitter at Northeast Utilities for over 20 years. He saw many violations of safety, and he became a whistleblower because he couldn't tolerate the way things were done at the plant any longer. He was fired for reporting those safety concerns. (MPS-6-4)

Comment: We really believe the plants are safe. I believe they're safe, and I can see the tower from my house. And I brought up my family, and about 1,200 people who work at Millstone, who live in the community, they're not fools either. (MPS-12-3)

Comment: Recently, the American Society of Mechanical Engineers endorsed nuclear power as a safe and efficient source for supplying energies, and addressing our growing needs. Aside from my own support for renewable energy -- and my record over the 12 years certainly indicates my support for renewable energy, including the restructuring bills. (MPS-14-2)

Comment: So what I am trying to put into the record on behalf of Nuclear Energy Advisory Council is the report to the public is that since the restart of the Millstone plants, Millstone's 2 and 3, they have been operated in a safe manner. In fact, based on that performance, there is no reason why I would recommend to the Nuclear Energy Advisory Council that the council vote to oppose the continued licensing of the plant. (MPS-24-1)

Comment: After a hearing in Waterford on Jan.11, a fire broke out Jan.14 highlighting the vulnerability of these aging plants. (MPS-28-2)

Comment: In 2000, Northeast Utilities acknowledged that – even under daily supervision by onsite inspectors of the NRC – it had lost two highly radioactive spent fuel rods from the Unit 1 spent fuel pool. (MPS-82-22)

Response: *The NRC's environmental review is confined to environmental matters relevant to the extended period of operation requested by the applicant. Operational safety is outside the scope of this review. An NRC safety review for the license renewal is conducted separately. Although a topic may not be within the scope of review for license renewal, the NRC is always concerned with protecting health and safety. Any matter potentially affecting safety can be addressed under processes currently available for existing operating licenses absent a license renewal application. The comments do not pertain to the scope of license renewal as set forth in 10 CFR Parts 51 and 54. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.*

Aging Management

Comment: NRC regulations limit commercial power reactor licenses to 40 years, but also permit such licenses to be renewed where appropriate. In the case of Millstone, however, renewal for 20 years is not an appropriate public policy decision. The NRC recognizes that some structures and components of nuclear plants may have been engineered on the basis of an expected 40-year service life. Suffolk County is not reassured by the assumption made by the NRC in NUREG-1437, Vol. 1, section 5.3.1.

"In assessing the impact on the environment from postulated accidents during the license renewal period, the assumption has been made that the license renewal process will ensure that aging effects on the plant are controlled and that the probability of any radioactive releases from accidents will not increase over the license renewal period."

This does not appear to be a credible position in light of Dominion's statement (Supplement 22, page xviii) that it "did not identify any major plant refurbishment activities or modifications as necessary to support the continued operation of Millstone for the license renewal period." The county has difficulty reconciling the two positions that, 1) the NRC will "control" the effects of an aging plant forty years into the future, and yet 2) Dominion foresees no major maintenance activity as necessary for safe operation through the year 2045. (MPS-52-4)

Response: *Major refurbishment is a class of activities which typically occur only once in the life of a nuclear plant, such as replacement of PWR steam generators. As discussed in Chapter 3 of this SEIS, there are no planned major refurbishment actions. These major refurbishment activities are separate from activities associated with aging management. Safety matters related to aging are outside the scope of this environmental review. The comment does not pertain to the scope of license renewal as set forth in 10 CFR Parts 51 and 54. The comment provides no new and significant information; therefore, the comment was not evaluated further. There was no revision to the text of the SEIS.*

Need for Power

Comment: As you know, Millstone is a vital component of New England's energy infrastructure and provides the equivalent of roughly 48 percent of Connecticut's electricity, which is enough to meet the needs of more than one million homes and businesses without generating greenhouse gases that contribute to global warming. (MPS-7-1)

Comment: We do need electricity. Millstone produces close to the equivalent of 50 percent -- think about that -- 50 percent of the electricity Connecticut uses on a daily basis. (MPS-12-1)

Comment: One way or another, we need electricity. We need electricity to conduct our businesses. We have set up a huge infrastructure. Our huge way of living is dependent on this. And we can continue to explore the many, many other alternatives, alternate power sources. And we should do that, but it's undeniable that, certainly at this point in time, this is what we have to go ahead and do. And I want to support it. (MPS-20-2)

Comment: First, from a regional and Connecticut energy needs point of view, Millstone has been an essential resource for the existing bulk power system. This essential resource need is expected to continue as such into the future. (MPS-79-2)

Comment: Keeping Millstone operational greatly adds to the diversity of fuel supply in Connecticut and the region. (MPS-79-3)

Response: *The comments are related to the need for power. The need for power is outside the scope of the SEIS analysis. Need for power is excluded from consideration in license renewal pursuant to 10 CFR 51.53(c)(2). Decisions about the ongoing need for power and operation of a nuclear power plant during the license renewal period are the responsibility of the State and the licensee. The comments provide no new and significant information; therefore, the comments were not further evaluated. No revision was made to the text of the SEIS.*

Regulatory History

Comment: They violated the Clean Air Act and, in April 2003, Dominion -- VEPCO agreed to a $1.2 billion enforcement settlement. $1.2 billion -- that's about the same as they paid for Millstone -- with the U.S. Department of Justice and the U.S. EPA for violations of the Clean Air Act.

The EPA charged VEPCO with failing to obtain the requisite permits for significant modifications it made to its coal-fired power plant in West Virginia that resulted in increased power generating

capacity. The Clean Air Act requires that such modifications be accompanied by the installation of pollution control equipment to mitigate environmental contamination.

Well, VEPCO neglected to install such equipment, which according to the EPA resulted in the release of "massive amounts" of sulfur dioxide, nitrogen oxide, and particulate matter. So, obviously, they're not going to do it of their own free will, if they did that kind of massive pollution in West Virginia. (MPS-3-12)

Comment: Dominion has a poor environmental record having been fined for having hidden violations of the Clean Air Act at another of its facilities. (MPS-28-7)

Comment: Yet, according to research by Public Citizen, a public-interest organization based in Washington, D.C., Dominion's record has proved otherwise.

According to Public Citizen, in April 2003, a Dominion subsidiary agreed to pay $1.2 billion in a settlement with the U.S. Department of Justice when it violated the Clean Air Act by increasing power-generating capacity of a huge coal-fired power plant in West Virginia without obtaining mandatory permits.

A year later, according to Public Citizen, Dominion paid a $500,000 civil penalty and had to offer a $4.5 million refund to its customers after the U.S. Federal Energy Regulatory Commission (FERC) caught the company violating federal regulations. (MPS-46-7)

Comment: Together with Unit 1, these reactors have had an operational history since 1970 which is among the ugliest in the annals of the nuclear industry. Millstone's radioactive releases have been among the highest of all nuclear reactors in the United States. Millstone's routine radiation releases were linked early-on with cancers and other diseases. Millstone's treatment of its workforce by way of exposing it to unnecessary radiation levels and its treatment of nuclear whistleblowers by ostracism and retaliatory firings have made it notorious within the nuclear industry. While full-time inspectors from the NRC were onsite, Millstone lost two highly radioactive spent fuel rods. These irradiated rods contain plutonium and other fission elements which may be diverted to create dirty bombs. While Millstone's environmental monitoring program was being monitored by the NRC and Connecticut's Department of Environmental Protection ("DEP"), Millstone's personnel brazenly falsified environmental monitoring reports to the NRC and DEP and sabotaged the sample-taking activities. (MPS-82-2)

Comment: Nor does the SEIS examine the quality of environmental stewardship exercised by Dominion in its other corporate activities.
We suggest you review the October 2003 report by Public Citizen, "Dominion Resources, Inc.; A Public Citizen Corporate Profile." Public Citizen reports that "[I]n April 2003, Dominion's

VEPCO agreed to a $1.2 **billion** enforcement settlement with the US Department of Justice and the US Environmental Protection Agency for violations of the Clean Air Act." (Emphasis added.)

The report further states that Dominion's VEPCO failed to install pollution control equipment at its coal-fired Mount Storm Power Plant in West Virginia after it made significant modifications that increased power-generating capacity. This was a violation of the Clean Air Act and, "according to the EPA, resulted in the release of 'massive amounts' of sulfur dioxide, nitrogen oxide, and particulate matter."

Dominion's Dominion Energy, owner of the Brayton Point Power Station in Massachusetts, releases 240 pounds of toxic mercury annually from that facility – enough to poison 120 million pounds of fish part of the Dominion network of companies, according to the Providence (RI) Journal of March 11, 2005. Eating mercury in fish and shellfish presents a danger to children and pregnant mothers by harming developing nervous systems. Dominion Energy has been served with a notice of intent to sue by the Conservation Law Foundation, according to the newspaper report. (MPS-82-13)

Comment: The NRC placed the entire Millstone Nuclear Power Station on its "Watch List" and ordered an unprecedented three-reactor two-year shutdown in 1996 because of national media exposure of wilful, systemic disregard for safety standards and licensing requirements; Unit 1 never restarted, Unit 3 restarted in 1996 and Unit 3 restarted in 1999; .... (MPS-82-18)

Comment: In September 1999, Northeast Utilities, predecessor to Dominion, pleaded guilty to committing environmental felonies including falsifying environmental monitoring records and releasing hydrazine, a carcinogen, illegally into the Long Island Sound. (MPS-82-20)

Response: *The issue of compliance with permits and requirements for other facilities or compliance by companies other than Dominion is not within the scope of the SEIS. The comments provide no new and significant information; therefore, the comments were not evaluated further. There was no revision to the text of the SEIS.*

Appendix A, Part 2. Public Meeting Responses: Excerpts and Comment Letters

A.5 Public Meeting Transcript Excerpts and Comment Letters

Transcript of the Afternoon Public Meeting on January 11, 2005, in Waterford, Connecticut

MS. MERRILL: Yes, I do. (MPS-1-1) I'm looking at I guess the economics of -- not just the economics of a town and what would happen to the taxes if it closed or stays open or whatever, but what about the economics of people with cancer? That's another economics that's factored in.

It caused people to get sick, and it cost the town and the insurance companies to pay for it, not just the tax benefit to having a nuclear power plant versus the cost to shut it down. So there's the human side, plus the financial side. That's what I'm getting at. I think it's terribly important to those of us who have been impacted.

MS. BURTON: Thanks very much, Chip. I'm Nancy Burton. I'm here representing the Connecticut Coalition Against Millstone.

(MPS-2-1) I was interested to hear the comment that this environmental impact statement draft addresses the issue of radiological impacts and cancer in the community. I have reviewed every page of this document, and I have found nothing here that seriously addresses or, in fact, even addresses the link that the scientific community has established between radiological emissions from nuclear power plants such as Millstone and cancer.

In fact, what I have seen in this report is an outright statement that no link has been established between the radiological emissions from Millstone, which we know are among the very highest in the entire country, and the high incidence of cancer which has been identified in this area.

MS. BURTON: Thank you, Chip.

Mr. Emch, I have a question about the procedure here, because a great deal of information was presented during the proceedings that were before the Atomic Safety and Licensing Board that somebody here had reference to. And during those proceedings, the Connecticut Coalition Against Millstone presented a great deal of information.

And you were in attendance at those proceedings as well as, if I'm not mistaken, Victor Nersis, Serces, whatever his name is, and others representing the NRC. For instance, (MPS-2-2) there was a document presented which was the affidavit of Dr. Ernest Sternglass, which went through chronologically, historically, the scientific links between radiological emissions from nuclear power plants such as Millstone, and, in fact, including Millstone particularly, and cancer, including very recent -- a very recent report appearing in The Journal of the American Medical

Association linking dental X-ray exposure to pregnant women to early childbirth, premature labor, and potentially significant problems later.

(MPS-2-3) In addition to Dr. Sternglass' affidavit, you saw us present documents from Joseph Mangano in which he detailed recent analysis of teeth donated by children. And these teeth, according to the declaration provided by Mr. Mangano, were analyzed for Strontium-90 content. And the information that was submitted showed that the baby teeth collected in the State of Connecticut had, in the areas nearest the nuclear power plant, double the level of Strontium-90 as compared with the average -- so-called -- in the population, measured in picocuries per calcium -- gram calcium.

(MPS-2-4) In addition, you saw that we presented a report, a recent report from the European Commission on Radiation Standards, which in very conscientious terms analyzed the present levels/standards of radiation exposure that are being applied in these present proceedings and found, on the basis of overwhelming scientific evidence, that the standards are probably 100 to 1,000, or possibly more, understated, and that the standards should be very, very significantly heightened in order to protect the population from disease from cancer and even genetic mutation.

(MPS-2-5) We presented to those proceedings an affidavit from Cynthia Besade -- a resident of Waterford for many years, and a person knowledgeable as to aspects concerning former workers at the Millstone power plant, including her father who was one of seven pipefitters who all died of similar diseases, cancers, before their time.

Her affidavit also detailed examples of children dying of leukemia and other diseases in the community, friends, mothers of

MR. STEINBERG: Okay. (MPS-3-1) Before Nancy Burton was making the point that information from scientists in the radiation and public health project -- that was available at a -- a related hearing about this issue -- was not considered in your draft.

MR. BOWMAN: My name is Peter Bowman. I may not have followed correctly, but there seemed to be -- something was put up there about solid waste, and I'm assuming it has to do with the spent fuel. (MPS-4-1) How can a decision be made on impact of spent fuel on the system when we have no real plan in this country for dealing with spent fuel?

The future of Yucca Mountain, which is the designated repository, is in doubt over many, many areas, both technical, legal, and environmental. And the possibilities of moving fuel to Yucca Mountain within the next 20 or 30 years seems very remote.

So how can we talk about the impact of spent fuel on this impact -- on this statement here when we don't have a real answer to it, other than to -- talking about putting it into dry cask storage on site, which, to me, makes the site a long-term repository for spent fuel which, my understanding is, is not allowed under the laws of Connecticut.

MS. BOWMAN: Yes. (MPS-5-1) You referred to the ICRP and other agencies, which primarily refer to externally received rems/doses of radiation. What I want to know is: have you looked and are you considering the latest information, the latest scientific information, both from Great Britain and from the United States, that refer to internal emitters and the effect of internal emitters?

MS. BOWMAN: Yes, I do have questions. (MPS-5-2) You mentioned the Columbia Healthy Worker Effect Report. It sounded a little confusing to me, because originally the Healthy Worker Effect was discovered or outlined by Dr. Mancuso with the help of Dr. Stewart, Alice Stewart, from Great Britain.

And the point of that Healthy Worker Effect was that the people hired to work on a regular basis at nuclear plants at the particular site that they were referring to are people at the prime of their life in a healthy condition.

Therefore, the effects of radiation are not as powerful on them as it is on infants and old people and children in utero, so that they pointed out that that was not a good basis on which to establish safety standards which are the standards which are now being based -- they are based on.

And, therefore, those standards are wrong,

(MPS-5-3) But you are not -- didn't seem to be addressing the constant flow of waste going to Barnwell and their impacting an African-American community of low income and constantly building up and causing a great deal of trouble and health harm there.

So it seems to me that the environmental impact statement doesn't raise that issue, and I wonder why.

(MPS-5-4) The question of alternatives also bothers me. You seemed to set your priorities in the wrong direction. I may be wrong about that, but you mentioned first coal, gas, and all kinds of alternatives, which are not generally considered good alternatives.

You just barely touched on solar and wind, which, along with environmental conservation and energy efficiency, conservation and energy efficiency you didn't mention at all. And I wonder if that's in your -- was in your purview.

MS. BOWMAN: Yes. (MPS-5-5) I want to ask you whether you include what the administration, the present administration of our country, is constantly beating on, and that is the question of sabotage and terrorism, and now the question of natural disasters by the way they're -- the disaster in the Indian Ocean included a nuclear plant. And have you considered all these aspects in your report?

MS. BESADE: My name is Cynthia Besade, and I'm actually -- nice to meet you. (MPS-6-1) I'm concerned because the entire plant is built on an ancient earthquake fault. The probabilities of movement, seismic movement, are there. How could you possibly calculate that that was of low impact?

(MPS-6-2) You talk about, you know, tsunamis being of a low, you know, statistical value. However, earthquakes are not of low statistical value. That can happen at any time. But, you know, these acts of nature are something that we don't have any control over.

If we were to experience what was just experienced a couple of weeks ago in the Asian countries, how in the world are we going to handle something like that? That is going to -- you know, the earth is going to open up. Those buildings that are moved we're going to have leakage of any containment that's inside of the buildings.

(MPS-6-3) It would be a sequential event. We would have an earthquake, which would be followed by flooding, which would be followed by interruption of the structures. We'd have openings for that radioactive element to be exposed into the environment. How can that be put down as, you know, just a small thing of value, or small impact?

FACILITATOR CAMERON: Okay. Thank you. Thank you, Rich, and thank you for your patience also.

We're going to go to the second part of the meeting and hear from all of you. I just want to reiterate that because we do have a number of speakers, I'm going to ask you to follow a five-minute guideline. And I apologize in advance if I have to ask you to wrap up.

And we're going to try to get to the people who have to catch the ferry first, and others who have commitments.

Five minutes is enough to at least alert us to what your concerns are. We have already heard some of those. The public comment period is your chance to respond in detail and tell us what we should consider in the environmental impact statement.

Before we go to other members of the public, I just want to give the license applicant an opportunity to talk about what their vision, their rationale, is here. And we have Mr. Scase from

the company, from Dominion, who is going to talk to us, and he is the Director of Nuclear Licensing and Safety. Is that right, sir?

MR. SCASE: Yes, that's correct.

FACILITATOR CAMERON: All right. And we have a copy of his presentation for the record.

MR. SCASE: Thank you.

MS. BURTON: (Inaudible comment from an unmiked location.)

FACILITATOR CAMERON: Okay. Let's let him make his comment, because that's usually what we do.

MS. BURTON: (Inaudible comment from an unmiked location.)

FACILITATOR CAMERON: Okay? Because your comments are much more important in a sense. This is part of the backdrop. So we're going to let him do it, so that we can get on with it. Thank you. Go ahead, Steve.

MR. SCASE: Good afternoon. My name is Steve Scase. I am the Director of Nuclear Safety and Licensing at Dominion's Millstone Nuclear Power Station and have been working in the nuclear industry for 34 years.

I'd like to thank the Nuclear Regulatory Commission and the town of Waterford for providing another opportunity for the public to speak on this important issue. As you know, the Millstone power station is seeking to renew the operating licenses for its two operating reactors -- Millstone Unit 2 and Millstone Unit 3 -- for 20 additional years.

As part of this rigorous process, we have conducted a study which took place over a period of almost two years analyzing potential environmental impacts associated with the additional years of operation. At the environmental scoping public meeting last May, I related how Dominion's license renewal team has spent many hours carefully preparing the environmental report.

In fact, we spent thousands of hours collecting and analyzing the data. This data not only included site-specific issues, but also compared national and worldwide industry knowledge and experience.

Following this submission, hundreds of additional hours have been spent supporting the Nuclear Regulatory Commission's detailed review of the report to ensure that Millstone's

continued operation will provide Connecticut and New England with safe, reliable, and environmentally responsible power well into this century.

The NRC's comprehensive evaluation of the environmental issues associated with license renewal for the site has resulted in the draft environmental impact statement which is the subject of this meeting.

I would like to take this opportunity to thank the NRC review team for their hard work. Dominion recognizes the complexity of the issues that were evaluated and believes that the team did a very good job in the review.

(MPS-7-1) As you know, Millstone is a vital component of New England's energy infrastructure and provides the equivalent of roughly 48 percent of Connecticut's electricity, which is enough to meet the needs of more than one million homes and businesses without generating greenhouse gases that contribute to global warming.

As the electricity demands of New England and Connecticut grow in the coming years, Millstone will clearly play an important role in meeting these needs. The men and women of Millstone strongly believe in enhancing the quality of life in southeastern Connecticut through volunteerism, public service, and our commitment to protecting the environment.

Whether this participation is through our involvement in the United Way, or working in a local park, or building a playground for a school in need, we are involved in our community. We view this participation as part of our responsibility to the communities in which we live and work.

Because we raise our families in these communities, we understand the importance of operating Millstone in a safe and environmentally responsible manner. Ensuring that Millstone's continued operation meets or exceeds the NRC's stringent guidelines for operations is important to us, not only as employees but as citizens and neighbors in our communities as well.

Dominion has long been recognized as a leader in the nuclear industry, and each day we maintain our commitment to operating Millstone safely, reliably, and economically. After carefully weighing all of the factors associated with renewal of the Millstone Unit 2 and Unit 3 operating licenses, we are confident that Millstone will continue to play an important role in providing Connecticut and New England with safe, reliable, and environmentally responsible energy for many years to come.

Thank you.

FACILITATOR CAMERON: Okay. Thank you, Mr. Scase.

We're going to extend a courtesy to those who did travel a long way, and we're going to go to, first of all, Mr. Joshua Horton. And Mr. Horton is the supervisor of the town of Southold in Southold, New York.

And then, the next two speakers, we're going to go to our Michael Domino and Marie Domenici.

Thank you. All right.

MR. HORTON: Thank you, Chip. I certainly appreciate the courtesy of being allowed to go first, if you will, in the comment period.

Just one thing I want to mention -- my name is Josh Horton. I'm the supervisor of the town of Southold, your neighbor across the Long Island Sound, about 10 miles, if you will, to your southeast.

A supervisor, for those of you who don't know, is -- and don't understand the New York State construct of government -- don't try to learn it, but the supervisor essentially is your First Selectman. I'm elected by -- I represent 22,000 people in the town of Southold, the county of Suffolk, in the State of New York.

And just as a point of order and reference to generic environmental impact statements, and how they are run, and the public hearings that are associated with them, with all due respect, Chip, you can take the five-minute rule and put it out in the parking lot.

This is a public hearing, and under at least New York State rule -- law, and I'm sure it's the same as Connecticut State law, you cannot limit the public's time to speak at a public hearing. You can do so at your public meetings while you're addressing resolutions. You cannot legally limit people's time to speak at a public hearing.

So I may need a little more than five minutes. (Applause.)

And I don't come here as an adversary, but I do come here as a staunch representative of the public. Your boss is the NRC. Mr. Millstone, your boss is Dominion. My boss is 22,000 people in the town of Southold. (Applause.)

I do have some prepared remarks, and I heard so much here today that I'm going to try to stick to my prepared remarks, because I think so many of you have so much more technical expertise and knowledge as it relates to Millstone and how it affects your community.

I want to talk a little bit about how it affects the community of Southold town. Now, understand, we receive no tax benefit. We receive no power in the town of Southold from Millstone. We don't want it. We don't want the tax revenue, and we don't want the power. We don't want it.

We said no to Shoreham, and we won, and that was because we, the citizens, brought the power of the government to bear. Now, I may be the power of a small government, a very small government, in fact; I'm still the power of the government of the oldest town in the State of New York, still 22,000 strong, still in a congressional district in the State of New York and the United States House of Representatives that carries a lot of weight, still with two very powerful United States Senators, and I intend to bring that power of the government to bear on this issue because, quite frankly, ladies and gentlemen, your generic environmental impact statement is flawed, direly flawed, gravely flawed.

To get down to it -- and I think Mitzi hit it on the head -- I -- you know, it's the residents who always say it so clearly. You put more effort into studying the effects of Millstone on winter flounder in this generic environmental impact statement than you did on me. Than you did on me, a living, breathing person, that is able to hop on a ferry and come here in an hour and a half on the ferry. More effort went into the environmental impact, the impacts on winter flounder.

(MPS-8-1) Now, let me tell you something. Winter flounder are running strong in our neck of the woods. They're running strong. You do the math. We've got winter flounder in Poconac Bay. We've got winter flounder off the tip of Montock. It's running strong, and it's running strong because the New York State Department of Environmental Conservation has set regulations and limits in regard to how they're caught, protecting their habitat.

And I'm sure the EPA or their environmental organization over here has done the same -- protected the habitat, protected the limits. Therefore, if they're not flourishing in or about the bottom feeding grounds of Millstone, you're going to have to draw your own conclusions. You've done it here in this environmental impact statement. I'd just like to challenge that.

And I'm going to now move to my prepared remarks. I have several comments and strenuous objections to make to the DEIS today, which will be further supported by more extensive written comments in the near future.

(MPS-8-2) That is necessarily the case, because even though a portion of my town -- Southold town -- is located within the EPZ of Millstone, and the rest of my town is just a short ferry ride away, my office received no official notification of these hearings. That's the first I'm hearing of a scoping session.

Now, I've run GISs, all right? I've done that. I've been the head of it, the lead agency, the whole nine yards, and I can tell you that notification is the fruit, the very essence, of getting the public's input. Because if we don't know about it, we can't input it. All right? I knew nothing of this.

When you have an incident at Millstone, you call Governor Rell, and you call me. Yet I knew nothing -- nothing -- of this hearing today. I knew nothing of the scoping session in May. And you bet your ass, if I had, I'd have been here.

(MPS-8-3) Your EIS, the process, not even the EIS, skip the EIS, the process alone is flawed, and you've got to start over. You've got to start over with all of us involved.

Steve Mizull -- does he still work for you? Does Steve Mizull still work for you? I haven't heard from him since the last time you had a minor incident -- release of radioactive material in March of 2003. I have residents who live within the EPZ of Millstone that I have to evacuate in the event that you have a situation that would warrant that.

So, in fact, the notification I raise as my first objection to the document and the process as a whole. Not one person from the NRC, not one person from Dominion, not one person at any stage of our emergency management chain of command, or our elected Federal delegation, contacted my office about this hearing.

And make no mistake about it, a portion of my township -- Fishers Island and the Federally-held property under the Department of Homeland Security, which was the United States Department of Agriculture, Plum Island, which is also within my township, exists within 10-mile EPZ of Millstone. And, furthermore, the rest of my township lies a breath away from the EPZ boundary.

To think that a simple notification to an affected municipality was overlooked undermines the credibility of this process at the starting gate.

I object that the DEIS or GEIS -- don't you love when us government people start talking in (MPS-8-4) acronyms -- I object that the GEIS contains no evacuation plan for the residents, or no reference to evacuation, for residents of Southold town or elsewhere on eastern Long Island.

The geography of Long Island creates an extremely dangerous situation for those residents. I don't know if you know anything about Long Island, but we can't get off of Long Island on your average work day in an organized fashion. You try and get on the Long Island Expressway and head to Manhattan between the hours of 6:00 and 8:00, and you're going to be sitting in a parking lot.

Throw a little release of radioactive material in that parking lot, and now it turns to a mess of cars tailgating and creating incredible accidents and anxiety among the people. At the very end of a narrow strip of land there is only one direction to travel in the case of an emergency. I'm just speaking specifically about the town of Southold and the North Fork.

At the end of this very strip of land, one direction to travel in the case of an emergency, and that direction is west. Now I'm curious to know how many other nuclear power plants have municipalities within the 10-mile EPZ that have only one direction they can travel over land?

Name one in the United States of America. Trojan in Portland? I don't know. The one in Delaware? No. Even here in Waterford you can go north, east, or west. God help us. We have two country roads upon which to travel. And though we may be 11 miles, as opposed to 10, away from Millstone, we have two small country roads that cannot handle the traffic of our annual pumpkin season, for God's sakes.

Halloween time rolls around, we can't get out of Southold. People are buying jack-o-lanterns. You expect us to get out of Southold town on a Sunday afternoon after you've blown the stack at Millstone? You've got to be kidding me.

We are in the year 2005. I come from a generation of people that have grown up protecting the environment, and I come from a generation of people that have grown up exploring alternative mechanisms for electricity and for -- to meet our power needs.

You are operating on mid-'50s technology, and it's just not acceptable in this day and age. Shake your head, Mr. Dominion, but that is clearly the case.

There is, in some cases, only one road on which to travel -- New York State Route 25. By the time us North Forkers reach mid or western Long Island, we will be lined up on the Long Island Expressway behind the millions of other Long Island residents who have the same one and only direction in which to travel.

This is a natural recipe for a manmade disaster. That must be avoided.

I understand that the 10-mile EPZ is a product of Federal regulation. The GEIS is an official government process within which you have the opportunity to address this matter. You have the opportunity to address this matter through the Federal Government, through the United States Senate, through the United States House of Representatives, in the context of the EIS, because that's what an EIS is about.

It's about identifying problems and providing alternatives and mitigation measures. So under the guise of this EIS, you have this opportunity.

To the extent that the drafters of the DEIS or GEIS seek to avoid creating an evacuation plan for eastern Long Island, on the purported grounds that Federal regulations only require such plans to do so within a 10-mile radius, they should and must consider the extreme circumstances that are present, and, therefore, extend the Millstone EPZ as it relates to the North Fork of Long Island.

The North Fork of Long Island is directly across the Long Island Sound. I can go to Horton Point in Southold, and on a clear day I can see Millstone. On a foggy day, I can see Millstone from one end.

Strong winds from the north and northeast often blow across the water directly to our shores. We are the first affected residents to the south of this plant. Southold town residents have only two small country roads on which to travel, and only one direction in which to go. As I mentioned before, that direction is west. That takes one further away from Millstone Nuclear Power plant.

To say that we are beyond the affected area is false and cannot be the basis for a proper EIS. With that knowledge, I maintain that it is imperative that the NRC expands the scope of its evacuation planning to a radius that encompasses the entire North Fork of Long Island.

(MPS-8-5) I am requesting that a fully-funded Federal emergency management study of Southold town's unique geographic challenges, and how this relates to the threat of a radioactive release at the Millstone power plant, be undertaken as part of this GEIS, and that the GEIS be considered incomplete without it.

(MPS-8-6) And, furthermore, that no permits for this facility be granted until such data is compiled, disseminated, thoroughly discussed in public, and its findings implemented. If this cannot be accomplished -- and I'm sure this cannot be accomplished by July -- so, gentlemen, you're going to have to hold this open. If this cannot be accomplished, then I call for the closure of the Millstone Nuclear Power plant. (Applause.)

Since this is a matter of Federal concern, and this is the subject of Federal regulation, it is crucial that the NRC seek and heed the input of Federal elected officials in the surrounding areas regarding the concerns of the constituents.

(MPS-8-7) I call upon the NRC -- and this I hope is reflected in your responses -- I call upon the NRC to request input and guidance from United States Senators Schumer, Clinton, Lieberman, and Dodd. And I don't want it from their aides. I think it's got to come from their mouths. I think you have to have a conference, a senatorial conference, and seek their input.

The same must be sought from Governors Rell and Pataki. In addition, NRC must seek the counsel and input from Representative Tim Bishop of the First Congressional District of New York, and his colleagues in Connecticut. The testimony of these officials must be incorporated into the GEIS and addressed within.

The EIS should not move forward until such input is formally sought and integrated into the document.

Ladies and gentlemen, I have made several points, recommendations, and requests on behalf of the 22,000 year-round residents that I represent. Mind you, in the summertime and on the weekends, our population doubles and, again, triples. On behalf of these people, I demand they all -- all of these remarks be addressed within the context of this formal EIS.

I don't look at this as a stumbling block. I look at this as a turning point -- a turning point for our communities, a turning point for how the United States of America can address its energy needs, and a turning point for the NRC to not be a promoter of nuclear power, but to be a regulator of nuclear power, which I believe is well within the charter of your organization -- an organization, quite frankly, that these all -- these people here fund on a daily basis.

I also want to enter into the record -- and I'm going to read through a few of these -- and I know that you're itching over here, Chip, to get me off the podium.

FACILITATOR CAMERON: No.

MR. HORTON: I've been in your position before. I've run these meetings, and I know exactly how you feel.

FACILITATOR CAMERON: I have to ask you --

MR. HORTON: However --

FACILITATOR CAMERON: -- we're giving you some leeway because of the --

MR. HORTON: Right.

FACILITATOR CAMERON: -- importance of your position, but I want to clarify, the five-minute rule is so that we can hear from everybody else.

MR. HORTON: Then you're going to --

FACILITATOR CAMERON: So can you --

MS. MERRILL: Come on. He's a lot more important than you are. Please let him finish.

FACILITATOR CAMERON: I know. That's true.

MR. HORTON: Well, no, it's -- we're all important here. Thank you. That's flattering.

FACILITATOR CAMERON: Can you wrap up, though, for us?

MR. HORTON: I'm going to wrap it up. But, again, I understand your five-minute rule, but your five-minute rule is applying to the licensing of a nuclear power plant.

MS. MERRILL: That's right.

MR. HORTON: So each one of these people deserves a little more than five minutes. Listen, I've been on the other end. I've run public meetings, I do it every week. And sometimes I'm sitting up there thinking, "Wow, I wish you'd stop talking." (Laughter.)

I know how you feel. All right? I know how you feel.

FACILITATOR CAMERON: Well --

MR. HORTON: I also have -- what I want entered into the official record is a portion of the GAO report that was done on Millstone and Indian Point. And this has to be entered into the EIS, because it's applicable to my request that it be looked into within the context of the EIS.

And this is not in regard to my request for the 10-mile EPZ being expanded. This is within the 10-mile EPZ. This is within the town of Southold that is affected by the Federally regulated or standard of 10-mile emergency protection zone. (MPS-8-8) And in the GAO, which, mind you, is a federally -- is a Federal agency, the GAO reports -- this is a compliance review matrix for Fisher's Island, which is a little teeny island out in Fisher's Island Sound that happens to fall within my jurisdiction.

Here are the requirements: identifies local, Federal, and private sector organizations that are part of the overall responsible organization. This is in response to the possibility of an evacuation for the residents of my community. Requirement met or not met? Not met. These agencies are not clearly identified.

Functions and responsibilities for major elements in emergency response specified for each organization and key individuals by title. Not met. The plan does not cite the legal basis for the key elements in emergency response.

This goes on and on and on as to the inadequacies that exist within the emergency management plan for a small island of 275 people that I represent. And the GAO says it's inadequate. Your EIS says you don't have to address it. Where do we meet on this? Who has to address it, then? The Federal Government said it's inadequate, and Dominion and the NRC say it's all right, it's an ongoing process.

The process cannot go on until the 275 people I represent are well taken care of, and that 10-mile EPZ be expanded. And I would like to have these entered into the record. You will get further written comments from my office, and also I just want to let you know that if this process does continue on, without having these requests specifically met, the town of Southold will see you in Federal court. (Applause.)

And thank you for the time.

FACILITATOR CAMERON: And can we get -- can you give those to --

MR. HORTON: All right.

FACILITATOR CAMERON: And do you want this? There you go.

Let's go to Michael first, and then we're going to go to Marie, and then we're going to go to Cynthia Willauer.

Michael? Michael Domino.

MR. DOMINO: Michael Domino. I'm a resident of Southold, Long Island, New York. I'm President of the North Fork Environmental Council. Our membership at this time includes approximately 1,500 North Fork residents. We're a diverse group, politically and economically, unified in our desire to advocate for a responsible, sustainable environment in our beloved North Fork.

The NFEC has never taken a formal position against nuclear power, and we're not prepared to do so at this time. Having said that, we have not taken a position in support of this particular power plant, nor do we do so today.

(MPS-9-1) In our view, site analysis should include, but not be limited to, stringent oversight of the physical plant, the management, detailed plans for transportation of fuel, and the final repository of waste materials, and placement of a plant in a remote location so that in the unlikely event of a catastrophe evacuation is feasible. We do not believe that this application meets those criteria.

Radioactive fuels have a half-life, and so do nuclear power plants. Certainly, there are strict maintenance procedures in place. With age, comes the increased probability that something will go amiss. This is not a new facility with an as-yet unproven track record. (MPS-9-2) The NFEC membership is very concerned that our location, some 10 to 11 miles south of this facility, will place in grave danger in the event of an unplanned evacuation.

Any severe accident evaluation, or evacuation plan which does not include the North Fork of Long Island, is deficient.

Residents, civic, and environmental groups have joined many elected officials from the east end and across Long Island, called upon our government to extend the emergency planning requirement from the current 10-mile radius to a 50-mile radius. By doing so, emergency planning for the North Fork would be required.

(MPS-9-3) As stated before, some North Fork residents live as close as 12 miles to the Millstone reactors, yet there are no plans in place to ensure the safety of these residents if there were an incident at the Millstone facility.

Because the North Fork is essentially a peninsula surrounded by water on three sides, we have only one direction to evacuate. That's west. Residents of Orient -- and I have a map, I'm going to submit it probably later on for -- for the record. Residents of Orient have only one road leading west until Greenport. There are only two roads from Greenport to Mattatuck, and three from Mattatuck to River Head.

In the event of an emergency, evacuation of the 22,000 year-round residents and 30,000 summer residents would be virtually impossible, not to mention the hundreds of thousands of Long Island residents who live to the west and who would also be evacuated. Because evacuation of Long Island is impossible, the Shoreham nuclear power plant was shut down. Many of us live closer to Millstone than to Shoreham.

(MPS-9-4) We are concerned also about the regulation and potential deregulation of what are termed "nuclear waste" and about the impact on Long Island Sound and the nation as a whole.

(MPS-9-5) The hearing was poorly noticed. Although the hearing may have met the legal requirements for notification, very few stakeholders in the North Fork were aware of today's hearing, or, for that matter, the entire scoping process -- we certainly were not given ample time to fully read, consider, and prepare thoughtful comment on the generic environmental impact statement for license renewal of nuclear power plants or the 449-page draft supplemental environmental impact statement, which examines the renewal of the Millstone licenses specifically.

Because the actions of the NRC in this licensing renewal process will affect the residents of the North Fork and Long Island, we request that the NRC hold an additional public hearing on Long Island. (Applause.)

(MPS-9-6) In conclusion, the NFEC wishes to go on record as being in opposition to the license renewal of Millstone Power Station's Units 2 and 3, and more detailed written comments will follow.

Thank you very much for the opportunity to speak. (Applause.)

FACILITATOR CAMERON: Thank you. Thank you, Mr. Domino.

We're going to go next to Marie Domenici. Did I -- am I saying that wrong?

MS. DOMENICI: (Inaudible comment from an unmiked location.)

FACILITATOR CAMERON: Okay.

MS. DOMENICI: Good afternoon, and thank you so much for having me come here and share my thoughts about the licensing of Millstone. I just want to say off the top that I think it's really important that, (MPS-10-1) as a community 10 miles across the pond, we are underrepresented here today because the turnaround time of notification was too short a time for anyone to really rally the troops. And, frankly, I find that a little bit -- a little disingenuous on behalf of the NRC, not to make it a point to speak to your neighbors.

On that note, I would like to read my statement. I don't profess to have any specialized credentials as it relates to this subject matter. I come here today as a citizen who has concerns about what I hear and read as it relates to the Millstone power plant and its impact on our environment.

Therefore, the following are my thoughts, concerns, and reasons for opposing this licensing.

Lack of notification to Long Island residents. (MPS-10-2) Currently, there is no plan -- plans in place to notify Long Island in the event of a nuclear accident. Legislation should mandate a 50-mile radius notification system.

Lack of an evacuation plan. And I'm not saying anything here that you haven't heard already, but you have to understand the importance of this. So there is no evacuation plan that will ever safely evacuate Long Island in the event of a nuclear accident.

(MPS-10-3) Environmental exposure to radiation, EMF, and cancer-causing agents. And we can dispute that from now 'til the cows come home. We do know that radiation is a cancer-causing agent, and we can sit here and deny or we can sit here and face the problem and try to make some kind of an amenable situation for all.

If you are trying -- you know, your presentation here was all very nice and all that, but you know what? As people who are against a nuclear power plant, you needed to hear what we had to say. We didn't have to sit here and sit through all of the processes that you go through as an organization. Perhaps in the future when you do have meetings like this, listen to what we have to say first. And if anyone is interested in what you have to say afterward, let your presentation be at the end of your meetings.

(MPS-10-4) The nuclear power plants are targets for terrorism, and we haven't even touched on that. Okay? The terrorists certainly know where all of our weak spots are. And a nuclear power plant just screams. You just may as well leave the keys in the car with the lights on and just let it happen, because that is what -- you can talk about all of the reinforcing, and you can talk about all that good stuff, but the reality is it doesn't work. And for anyone to try to make us think it will is also very disingenuous.

In reading the abstract on your website, I have grave concerns relating to the environmental issues identified by the staff. (MPS-10-5) And let me just say it only takes one catastrophic event, whether by nuclear accident or terrorist attack, to devastate this region. So to have 92 environmental issues, whether small or great, are 92 too many.

(MPS-10-6) Not only do we have to be concerned about a nuclear accident or attack, but we also have no place to put the spent fuel, and this poses an entirely whole set of other problems. Long Island has been targeted by the EPA to use the Long Island Sound as a dump site for Connecticut's dredge waste. The Sound is an estuary, and the EPA is the guardian of the estuary, and I find it unthinkable that the EPA feels that there will be very little impact in dumping over 200 million cubic yards of waste from Connecticut.

And although it may not be radiation waste, it was, because they cleaned up the submarine base in Grotton, or wherever. So what makes anyone think it's okay to dump in the Sound, or any other waterway?

The mere fact that Millstone does not have to notify Long Island -- its Long Island neighbors in the event of an accident prompts me to ask, who is minding the store? It is not -- is it not the role of the NRC to ensure the health and well-being of all people, or does the NRC have concern for only a chosen few? Environmental decisions such as this cannot always be made with political agendas, shareholders, or big business in mind. It can't always be about profit.

As a resident of Long Island, I resent the fact -- I resent the lack of concern by the NRC toward its Long Island neighbors. And as a citizen of this planet, I have grave concerns the NRC's vision does not have the very best interest for all people. Can anyone here from the NRC tell me, where do I take my family after a nuclear accident? What place would be safe? Do you have a place that you're going to go to in the event of an accident? Because we all need to be there. Okay? It's that simple, guys.

To quote from your website, "The NRC's primary mission is to protect the public health and safety and the environment from the effects of radiation from nuclear reactors, materials, and waste facilities." Please reread your mission statement from time to time, and remember why you are in business in the first place, and who you are supposed to be protecting.

Knowing the right thing to do in this case should not mean having to legislate or mandate laws. Doing the right thing should not hinge on risk assessments as the risks are too high. I think we all know what the right thing to do is in this case. (MPS-10-7) I go on record as opposing the issuance of this license.

Thank you. (Applause.)

FACILITATOR CAMERON: Thanks, Marie.

We're going to go to Cynthia Willauer, Tony Sheridan, and then Gail Merrill. Cynthia? Cynthia, I believe, has some individual remarks, and something from another organization. Is that correct?

MS. WILLAUER: Is this on? Or is this on? Or which is on?

FACILITATOR CAMERON: Yes, they're both on.

MS. WILLAUER: I'm skipping the individual ones and just speaking for two organizations.

FACILITATOR CAMERON: Okay. Thank you very much.

MS. WILLAUER: I live in Lyme, Connecticut, which I think makes me within the 10-mile radius that people have been talking about. And I'm representing two groups -- PACE, People's Action for Clean Energy, and Energy Option Study Group of Lyme. And I will begin with reading the PACE report. I serve as a radiation monitor for this group.

(MPS-11-1) PACE -- People's Action for Clean Energy -- a Connecticut State organization since 1974, representing 2,400 constituent households, strongly and adamantly opposes the

relicensing of Millstone. Our Board of Directors, members, and supporters are extremely concerned about terrorism. We've heard this before.

The spent fuel pools at nuclear plants are not adequately protected. In fact, we view nuclear power plants as weapons of mass destruction only waiting for terrorists to detonate them.

To further understand the reality of this scenario, PACE invites the NRC representatives here to join us on February 8th in West Hartford at St. Joseph's College to view the FX cable channel feature film entitled Meltdown. This realistic portrayal of the infiltration of terrorists into a nuclear plant is chilling and relevant.

(MPS-11-2) In addition, we are deeply concerned about the continuous release of radioactive isotopes that are emitted from these plants. These emissions have fallen on Connecticut's soil and water and have been emitted into the air for years.

The effects of radiation are cumulative. Since few studies have been done on the cancer rates around the plants, we only need to use our reasoning powers to understand that the radiation is harmful and that the degree of harm varies from individual to individual.

We do know that children and fetuses are extremely vulnerable to these long-lived and terrible poisons. (MPS-11-3) We are also worried about a nuclear accident. Old machines are fallible, as are the human beings who run them. We only need to look at the Davis-Besse in Ohio to understand the potential of what may occur without even the awareness of nuclear plant operators.

(MPS-11-4) In addition, we find the centralization that this kind of energy represents to be unwise. Our centralized grid is brittle, vulnerable to blackouts and terrorism. Decentralized energy substations, using renewable energy, would help to make us safer.

(MPS-11-5) Lastly, continuous operation of nuclear power plants creates more waste. Even if we send waste to Yucca Mountain, a seismic area, more waste will be created in Connecticut that will remain to hurt us or to tempt terrorists.

(MPS-11-6) We urge you not to relicense Millstone. Relicensing is a recipe for disaster.

And this is submitted by Judi Friedman, who is the Chair of PACE.

So now for the Energy Option Study Report. This is a group that was founded in February 1997 when news of Millstone's dysfunction was widely reported in the press. I was a co-founder of the group, because I was aware that I had been blind to the danger that Millstone presented. I was raising my children and training for work, and I was -- I was really blind to the dangers of nuclear power.

I had -- a friend remembers my saying I had my head in the sand. And we got together as a group, and we researched the hazards of nuclear generation of energy and the radiation emission of the plants, and we learned of the dangers of waste.

But more important, our focus was educating ourselves about alternatives to ongoing reliance on nuclear power and on dwindling fossil fuels. We learned about alternative sources of energy and the strides that are being made and that can be made in efficient use of energy.

(MPS-11-7) Our reading told us -- tells us -- and this I know is not -- not universally believed, but we believed it, and we studied this in depth. In combination with energy efficiency, methods of generating energy efficiently, and shifting to renewable sources, this can be done. It's not a myth. And other countries are already doing it.

So to relicense nuclear plants for another 20 years is to pull the rug out of initiatives to develop cost-effective renewable generation of energy, combined with change of policy for wise use. To pull the rug out -- this is to move the energy policy of the nation in the wrong direction. So we urge you: don't do this.

There are many points that we might make to convince you of our position, many of which have been made earlier. But I am limiting myself to sharing one, and it's -- this also has already been shared. (MPS-11-8) We don't know what to do with nuclear waste. I think it's unethical to generate hazardous waste in our community and transport it out for disposal.

It's unethical whether the community that is receiving the waste wants it or not, because the community that wants it is bound to be poor. They're in it for the money. They need the money. But what they get is contaminated groundwater and contaminated -- all that that means, all that the contamination of their community means.

And as for Nevada -- the State of Nevada having to receive it, put our foot in that shoe. We wouldn't accept the nuclear waste of another State or, worse, of the nation.

(MPS-11-9) Now, a time is opening up for us to change our ways. If we calculate the full cost of the ways we generate energy -- and I didn't hear the whole of the presentation, but I think the hidden costs were not mentioned, the health costs for instance, we learn that we can't afford to -- not to change our ways.

(MPS-11-10) Nuclear energy is expensive when the hidden costs are factored in. Expanding the use of renewable energy, combined with the creative design of wise years, is really the only way to go in the long run. But it takes study to know that this is so.

So let's take our heads out of the sand collectively and see the danger of relicensing, and the opportunity in not relicensing. It's exciting, it's interesting, and it's being done elsewhere. Let's bring the opportunity home.
Thank you. (Applause.)

FACILITATOR CAMERON: Thank you. Thank you very much. I'll give one to the transcriber, and we'll keep one. Thank you.

We're going to go to Tony Sheridan, and then we're going to go to Gail Merrill.

MR. SHERIDAN: Cynthia Willauer is a tough opponent to follow. Much of what she said I can have a good discussion with her over, and do indeed from time to time, and don't necessarily disagree with all she said -- of what she said.

But the fact is we are here. (MPS-12-1) We do need electricity. Millstone produces close to the equivalent of 50 percent -- think about that -- 50 percent of the electricity Connecticut uses on a daily basis.

You know, I'd like to think of

MS. BURTON: (Inaudible comment from an unmiked location.)

MR. SHERIDAN: No, I do not work for Dominion.

FACILITATOR CAMERON: Okay. Great. Go ahead, Tony.

MR. SHERIDAN: And thank you for reminding me. I'm President of the Chamber of Commerce of Eastern Connecticut, and I represent approximately 1,250 employers who employ a little over 50,000 people in eastern Connecticut.

MS. BURTON: (Inaudible comment from an unmiked location.)

MR. SHERIDAN: I didn't interrupt you, so I --

FACILITATOR CAMERON: Nancy, if someone wants to come up and make --

MR. SHERIDAN: -- would appreciate it if you didn't interrupt me.

FACILITATOR CAMERON: -- a comment, they can make a comment. So let's let Tony continue, and then we'll get to the rest of everybody, including you.

MR. SHERIDAN: I happen to be involved with this issue for a long time. I was First -- or Selectman in this town for 10 years, and First Selectman for 8 years. And there were good times and bad times.

(MPS-12-2) I was Selectman when Millstone had a lot of difficulty and when, quite frankly, the process was not like the process that I see here today. The process was quite unfair, quite awkward, and certainly wasn't as fair or as balanced as it seems to be today. So I appreciate the learning that both the NRC has done, and certainly it seems to be a lot more fair than the days of -- my Selectman days where we'd sit here night after night listening to NRC speak the speak and really not address the issue.

Today there is a valid attempt -- and I have seen that now for several meetings -- a valid attempt to take into consideration public comments. What I did when I was First Selectman -- and this is a little bit of criticism -- I allowed the people of eastern Connecticut to come and speak first. They're the people who live here, work here, who pay the price one way or the other of having nuclear power plants in their community.

With all due respect to our neighbors in Long Island, we would ask them to wait their turn. But that's another point.

I would like to speak to the importance of having these plants renewed, but I'd also like to pick up on a comment that Cynthia Willauer made. This can't be the end of our energy invention, if you want. We have got to continue to look at better and safer ways to produce electricity, and we will.

This country -- this is what makes this country great. We're always willing to push the envelope and learn more. What we know today about electricity and about nuclear power we didn't know 10 years ago, and hopefully there will be other forms of energy 10 years from now that we may not need to have this debate. But it's critically important in the meantime to have a steady, reliable supply of electricity or we'll quickly become a Third World State.

And I'm serious about that. We need energy. Energy is the mother's milk of economic development. People need jobs. What are you going to do? If you close down Millstone, you're going to import that amount of electricity? Fossil fuel generated electricity? Let's talk about the environment.

I remember a few years ago, not 20 years ago, when I could go out to my car and write my initials on the hood of the car because of the coal and the fuels that were burning up here in Montville. And I lived three miles away from the plant. So I think what we have is a bit improvement. Hopefully, there will be more improvements going forward.

Now, let me just -- there's been a lot of talk here about cancer today. Those are scare words, and I'm sorry your friends I think from Long Island have left. Have they left?

PARTICIPANT: We're still here.

MR. SHERIDAN: Oh, thank you. When I First Selectman, there was a concern that the ball fields, which are loaned to the town of Waterford by Millstone, were contaminated. That was the most recent scare that was out in the community.

Well, here I am First Selectman. What am I supposed to do? I called in -- and Ed Wilds is here from the Connecticut Department of Radiation. Is that right, Ed? And I called at that time Northeast Utilities, and I said, "We've got to look at this. We can't just accept 'no, they're not' for an answer."

We had every square feet -- foot of those fields measured. We found a big boulder that had radon. We did not find waste from Millstone. You could throw a stone from those fields and hit the tower -- the stack at Millstone. So please don't come to our community and try to use scare tactics. Bring your facts. You're most welcome. We want to hear them.

The opposition, the group who have expressed concern about Millstone over the years, have done a great service. They have made all of us more alert, more sensitive. But don't use scare tactics. Bring your facts and get them on the record, because we live here, and we're not fools. (MPS-12-3) We really believe the plants are safe. I believe they're safe, and I can see the tower from my house. And I brought up my family, and about 1,200 people who work at Millstone, who live in the community, they're not fools either.

So thank you very much for your time, and for the good job you're doing.

FACILITATOR CAMERON: Thank you. Thank you, Tony.

We're going to go to Gail Merrill at this point, and then we'll proceed with some additional speakers.

MS. MERRILL: I am so thrilled to be speaking after the last gentleman, because I'll straighten you out. Okay? I think you need it.

First of all, I don't even know where to start I'm so angry right now. My heart is just pounding, and it's not because I'm uncomfortable speaking. I've been sitting there for hours today waiting to be heard, and I think you should have heard from the public, because I don't want to hear the PR from the NRC or from Dominion. I don't want to waste my time. I had a two-hour drive here to get here.

And my mother is dead of breast cancer. She is 12 miles down from Millstone Nuclear Reactor on Long Island. Then, I got the tumor 11 months after she died. My tumor is not genetic. Now, I'm 77 miles downwind in New Caanan, Connecticut. I'm also impacted by Indian Point nuclear reactor. (MPS-1-2) But radiation.org did their research, and they proved statistically -- and published it in a book -- years ago that women who live within 100 miles of a nuclear reactor have the greatest risk of dying of breast cancer.

Now, anyone who doubts this information, you can see it visually. And this is the NRC's own map. So how do they refute their own map? And how do they refute the government that they work for? Here you go, folks. Here is the breast cancer mortality for women, 50 to 74 years old dying of breast cancer. It's not about any one town. It's all of us. It's the whole northeast. And the gentleman that just spoke doesn't have boobs. He doesn't store toxins in his breasts. Okay?

I'm tired of seeing women die, and I don't want to be one of those women that dies. There is 14-year old girls with breast cancer in Connecticut, more than one, and more than one 15-year old. And I'm not up here to scare you. I'm up here to tell you: this is reality. I've buried five women in their forties in all different towns in my area. In their forties.

I've watched 30-year old women getting double mastectomies and getting the cancer right back again. I don't think he'd like to go through that. And all of the hours it took to prepare these reports. How many hours do you think we spent in the chemo room?

So I don't care about pretty presentations. And I don't care about lip service. I don't want to die, and that's the reason why I'm here.

(MPS-1-3) The Tumor Registry says that you all have the highest cancer rate in -- is in New London County. And within that, the top -- the six towns around it, around Millstone, have the highest of 12 different cancers. That's the Tumor Registry, folks. They don't lie.

My tumor is in that registry, and too many others are in that registry, too. Okay?

Now, just so you don't miss it, this is the young women dying of breast cancer. Okay? It's not just about one town. And what makes me really mad from my perspective, who doesn't want to die, is how dare a town ignore the facts, lie to the public, and put their profits before public safety. How dare you.

You might want your schools. That's nice. But I understand one of your high school students had uterine cancer last year. There's a kid in Mystic -- a two-year old dead of bone cancer.

Now come on, folks. You've got kids. You've got grandchildren. This is not okay. Have you noticed that younger and younger people are getting cancers?

Look at the cemetery. A lot of older people lived to a lot later age in life. Look at the new graves. They're dying younger.

(MPS-1-4) This is the NRC map. Okay? I'll make it easy for you. There is a correlation. These are government maps that show that 20- to 49-year olds are dying in the northeast, and the 40- to 74-year olds that die in the northeast, and the Tumor Registry confirms it.

Now, for the people that feel like they got here late in the game, didn't know about this meeting ahead of time, the Attorney General feels that way, too. I had a little conversation with him last night. He doesn't like -- don't want to put words in his mouth. I'll stop right there. He's going to be involved in this process, because they weren't aware of this meeting either.

Now, for all you who doubt what I'm saying to you, here's a whole tape full of physicists discussing the corporate link, the cover-ups. I'm in here, the only person who isn't a scientist here. Okay? This won Best Documentary in an L.A. Film Festival. It's been shown in New York City up the wazoo, sold out crowds every time. GaryKnoll.com. Get it. Show it.

Now, I'm going to read to you what I have. I'm so angry. The Nuclear Regulatory Commission -- this is my environmental impact statement regarding the question of the license renewal of Millstone Nuclear Power plants. My statement is in support of the Connecticut Coalition Against Millstone.

I've been impacted by breast cancer at age 48 -- 20 years earlier than my mother got it --because I grew up with the nuclear chemical industries. She didn't, and my grandmother didn't, and she lived to be 86, never had breast cancer. Okay?

Yale said my tumor was less than 6 percent likely that it was genetic before they ever tested me. Okay? So don't think if it doesn't run in your family it's not your problem. Okay?

I've told you she lived 12 miles downwind from Millstone on Long Island, New York. She's also downwind of Indian Point Nuclear Reactor and the Northern Nuclear Reactor in New Jersey.

(MPS-1-5) That's why they have a nine-year old child down there in Long Island with breast cancer, and the government did a $6 million study to find the cause of breast cancer. They couldn't find it because they just happened to leave out the nuclear emissions as part of the study. That was exposed in the New York Times article by Dr. Janet Sherman, who works for Radiation.org. It was published.

I've been appalled by the horrific number of young women with breast cancer in Connecticut. In daily conversations from friends, family, hospice workers who take care of dying people, doctors, nurses, it's prolific, and the women are scared. As my neighbor said to me, who is next? She knows of four people in New Caanan where I live with all different kinds of cancers.

We don't have any toxic sites in New Canaan, folks. We have a four-year old with a brain tumor. Now we're downwind about 25 miles of Indian point, but we're also downwind of Millstone. It's too many different towns. It's too many young people. It's getting worse. Okay?

According to our government's National Cancer Institute's Atlas of Cancer Mortality -- that's the map that you just me -- or, sorry, that I just showed you. Okay? The government's own map -- I'm not making it up, folks. It's coming from too many sources. It's not scare tactics. It's reality. And I don't want this town to profit off of the nuclear reactor tax dollars at the expense of my health. That's where my anger comes from.

I don't want somebody to put their profits before my safety. And it's not just about me, Gail Merrill. It's all of us. Okay?

(MPS-1-6) Scientists at radiation.org have published a book "The Enemy Within: The High Cost of Living Near Nuclear Reactors." They proved it statistically. They are also documented in the nationwide tooth fairy project, which is documenting Strontium-90 in your baby teeth. Okay? It acts like calcium, radioactive cancer-causing chemical only from the nuclear reactors now, folks, because the nuclear bomb testing stopped quite a while ago.

The Strontium-90 acts like calcium, goes into your bones and teeth, where it nails your immune system, your thyroid function, so you're vulnerable to cancer, bacteria, and viruses.

Now, just to let you know -- a little alert here -- the first lawsuit has already happened. It's directed against the St. Lucie Nuclear Reactor in Port St. Lucie, Florida, because at least five children, last I heard, were suing because they could prove the Strontium-90 in their baby teeth. They did a big tooth fairy project in Florida. The kids with cancer had twice the Strontium-90 levels in their baby teeth as the kids who didn't have cancer.

And according to radiation public health, 35 baby teeth so far in Connecticut, the kids living closest to the nuclear reactors around Indian Point and Millstone Nuclear Reactor have the highest Strontium-90 levels. Okay?

So a lawsuit could very easily be in the works here. Get together, community. Get those baby teeth submitted. You can document illegal emissions, and our Attorney General said that's what he's going to do. If he can prove illegal emissions, he'll sue. I said, "We've got it." Okay?

Let's see. I'm almost finished here.

Okay. You know that New London County has the highest cancer rate. We've been through that.

Okay. Now, Dr. Ernest Sternglass, Professor Emeritus of Radiological Physics at the University of Pittsburgh School of Medicine, documented in a seven-page report dated August 8, 2004, his opposition to the renewal of Millstone 2 and 3 licenses. A 40-year history of documenting the effects of low-level environmental radiation on human health and development produced by nuclear releases.

He has testified as an expert. His report is submitted in to the NRC. That man, at 80 years old, sharp as a tack, travels internationally still, helped to stop the above-ground nuclear bomb testing by documenting Strontium-90 in baby teeth as the nuclear bomb blast blew across the country and they found it in St. Louis baby teeth.

He says the reason why Nevada on this map is in red is because they did underground nuclear bomb testing until '93. There is lots of evidence, folks, and I will fax it to whoever wants it. I will walk you through it. You can find your own mortality maps.

Too many of us have cancers in too many different towns. Too many of us are downwind of the cancer-causing emissions. You need to close Indian -- sorry. I'll say the same thing for Indian Point. What the hell?

It's the same game, folks. We're dying. Protect us. Come on. Somebody in here has to have enough heart to listen to what I'm saying to you. Or God help you, it'll be your mother or your daughter, somebody in your life will be impacted. And, men, you're damn lucky, because a lot of your cancers -- not all -- a lot of your cancers don't happen -- and your prostate might happen around 48. This is girls getting it. Childhood leukemias.

I'm not the expert here on the science, but I know enough to read the reports. And that's why Dr. Sternglass' material and Joe Mangano's material is going to be submitted to the NRC. And the Attorney General has received the books, because I hand-delivered it to him. And Senator Clinton, and Senator Kerry, they all know it.

We have a right to be safe. We don't want to die. So please, somebody, get off your chair and help us. (Applause.)

FACILITATOR CAMERON: Okay. Thank you. Do you want to put that on the transcript?

MS. MERRILL: Yes, I do.

FACILITATOR CAMERON: Good.

Next three --

MS. MERRILL: If anybody would like a copy of my material, I'll be happy to give it to you. Do you want to see the map?

FACILITATOR CAMERON: The next three speakers -- we're going to go to John Markowicz, Nancy Burton, and then Cynthia Besate.

John Markowicz? Hi, John.

MR. MARKOWICZ: Yes. For the record, I'm John Markowicz. I'm the Executive Director of the Southeast Connecticut Enterprise Region. We represent the 22 municipalities in southeastern Connecticut.

PARTICIPANT: We can't hear you.

MR. MARKOWICZ: My name is John Markowicz.

PARTICIPANT: Your mike is not working.

MR. MARKOWICZ: Yes. My name is John Markowicz. I'm the Executive Director of the Southeast Connecticut Enterprise Region. My corporation represents the 22 municipalities in southeastern Connecticut and associated businesses.

I want to thank the Nuclear Regulatory Commission for coming and taking the time to listen to us this evening -- this afternoon. It's almost evening. And I want to also thank you for your patience.

I have reviewed the GEIS, Supplement 22. I did not read all the appendices. I found some interesting facts about anchovies and winter flounder and a few things I didn't know much about. (MPS-13-1) I'd like to note that in my opinion the NRC has been very thorough and very detailed and very complete in the material that has been presented to them to date, and the information and the conclusions that are in this report.

I would particularly like to note that my comments at an earlier meeting regarding the socioeconomic impact of Millstone and the relicensing of Millstone have been accurately

represented. And I would also note that, in my opinion, the comments of other participants at those earlier meetings have been accurately represented, and, in the appendix that I did read, have been addressed.

(MPS-13-2) Upon review of this report, I submit the following comments for the record. I support the staff conclusions and recommendations that are contained in Section 9.3. I also reiterate our support for the relicensing of Millstone 2 and Millstone 3, as is documented on page A-14 of this report.

(MPS-13-3) Finally, I would ask that the comments that were made at the beginning of the meeting regarding the exemption of the emergency preparedness and the security issues associated with the plant that are not included in this be addressed as to the reason why, in the abstract, many of the members of my organization, and another organization that will speak this evening, continue to have concerns.

And the comments that were made at the beginning of the meeting as to why emergency preparedness and security issues are not in here should be included, so that that provides some information to address that issue.

Thank you very much.

FACILITATOR CAMERON: Thank you, John.

Nancy, are you ready?

MS. BURTON: Yes.

FACILITATOR CAMERON: We're going to go to Nancy Burton, and then we're going to go to Cynthia Besade. And we have a few more speakers after that. Nancy?

MS. BURTON: Thank you very much. That will be the end of the pleasantries.

I'm Nancy Burton, and I'm here today speaking on behalf of the Connecticut Coalition Against Millstone. I'd like to -- can everybody hear me? No? No? Thank you.

Razom Nas Bagato. Nas Ne Podolaty! That's a slogan I picked up a couple of weeks ago when I was in the Ukraine serving as an international election observer during the recent contested elections. And that slogan, I learned, translates to, "We are many. We will not be pushed aside."

And that slogan, of course, comes to mind as I appear here today to speak to you concerning the nuclear power plant. But before I do that, I wanted to display something very pretty that I picked up in the Ukraine. (Laughter.)

I have never done a fashion show before, but this is a beautiful --

FACILITATOR CAMERON: Do you think that we should --

MS. BURTON: -- blouse, handmade by women in one of the regions of the western part of the country. And I mention it because the work of the international election observers was made a little easier by the fact of the Chernobyl nuclear disaster in 1986, because it eliminated 73 villages from the political life of the country.

In other words, there were 73 fewer towns for people to vote in, because there were no more towns, no more people, and there never will be again for very many hundreds of years. And so, therefore, there are no cultures or customs or people or children or lives or memories there in that 8 percent area of the Ukraine.

We do not want Chernobyl to happen here. We do not want a situation where, as in Belarus, the country to the north that suffered even worse than Ukraine, where close to 50 percent of the gross national product today in the year 2005 is devoted to Chernobyl mediation mitigation, helping people who are diseased and unable to function in life.

I felt so bad for the hundreds of thousands of protesters who day after day after day in the rain and cold and snow on Independence Square in Kiev were warmed by fires made of wood that was brought in daily. What made me worry was when I read that 40 percent of the forests in the country are contaminated with radiation, and the radiation is released when the wood is burned.

We do not want that to happen here, and that is why we want the NRC to order the closure of the Millstone Nuclear Power Station. I've had occasion to read this entire draft environmental impact statement, and I'm going to throw it on the floor. Maybe I should put it in the fire -- I don't know -- because it is a pack of lies.

We know who paid for it. The nuclear industry paid for it. And I am saying that for 35 years in this community we have listened to lies, deception, chicanery, cheating, harming, and worse.

And as the people on the streets of Kiev have said, "They are many, and they will not be pushed aside." The same will hold for us. We have had enough.

Our government is not working for us. It is not helping us. Our government in this State is so deeply compromised at every level that we have an operating nuclear power plant that is causing people to get sick and die in our community. Go to Seabreeze Drive in Waterford and knock on every other door, and you will find a cancer case where people have died.

There are very many people who will not be in attendance at this meeting, because their heads are in their pillows and they are weeping because they have lost family members. We have had enough of this, and enough of the lies, and we will be heard this time. We have been nice so far, and times have changed.

(MPS-2-6) There is a summary of draft report findings in the back of this room. I wrote down five. Impact to human health -- impacts to human health are of small significance. Impact to air quality are of small significance. Impact of radioactive and non-radioactive waste management are of small significance. Impact of postulated accidents are of small significance.

Current measures to mitigate the environmental impacts of plant operations are adequate, and no additional mitigation measures are warranted. These are lies. These are willful, deceptive lies.

In the Ukraine, there were six people who were operating the Chernobyl nuclear power plant when the disaster occurred. They meant no harm to anyone. They were going through what they thought was well within the realm of what they should be doing to perform certain operations, and things didn't go well. The roof blew off, fires -- horrible fires started, and six people were prosecuted -- those were the operators of that plant -- and spent time in prison.

Well, in our society, we have doctrines that concern criminal conduct, and it has to do with knowledge and intent, and deliberate conduct. We have presented earlier in these proceedings, in court proceedings, in the Atomic Safety and Licensing Board proceedings in this case, in public meetings, we have documented that this facility is a killer of people. It's a killer of fish.

It's the worst predator against the environment in this part of the country, and the NRC has not listened. Dominion has not listened. Or if they have listened -- because how could they not hear -- they are acting deliberately to kill. And under our criminal code, that is an offense. And it's an offense that subjects an offender to time in prison.

I mention that because things are changing in the world and in this community, and we will not accept this treatment further.

I have very many particular comments to address. I see that it's 4:32, so I am just going to focus on a couple. One is the -- of course, I have to start with the health. (MPS-2-7) There's been a complete disregard of all of the information that has been submitted about health effects.

When the NRC can say, "Impact to human health -- impacts to human health are of small significance," do they mean small people, just to children, so it doesn't matter? Or what do they mean by that? They don't mean diddly, because they're just a rubber stamp for a company that paid for them to do this disgraceful job.

(MPS-2-8) When they say that it's of moderate significance that the fish population -- and the fish are important because we eat fish. If we don't have anything to eat, we die. There is a food chain, and when the fish die because they are eating worms that are radioactive from Jordan Cove -- and I didn't see the Cobalt-60 mentioned -- of Jordan Cove in this report -- then the fish get sick, and the birds that eat the fish get sick, and the people who eat the fish and other things get sick. We all get sick, and it's unnecessary.

I mentioned the problems that we have in government that are not -- that are standing in the way of correcting what we have here with the Millstone menace, and it extends to each of the branches. It extends to legislative committees where Melodie Peters -- she is seated here -- maintained a position as Chairman of the Energy and Technology Committee while she went officially on the payroll of Dominion.

The Ethics Committee of this State ruled that that was permissible, and so she carried on in that way. There was a Judge of the Superior Court, Judge Langaumback, who actually met ex parte with lawyers for Dominion and Northeast Utilities and then canceled a hearing that had been scheduled to consider whether there should be a transfer of expired and illegal permits to Dominion.

(MPS-2-9) Those are the same expired and illegal permits that the NRC today is saying are perfectly valid and permit Millstone to kill fish, discharge waste -- radioactive waste and caustic chemicals in the Sound. A Judge of the Superior Court actually did that.

We know that Dr. Wilds of the DEP went on a junket trip at the expense of Dominion to a nuclear waste site, and yet did not report that to the Siting Council recently when he was --

FACILITATOR CAMERON: Nancy? Nancy?

MS. BURTON: Pardon me?

FACILITATOR CAMERON: I'm not trying to say anything about what you're saying, but can we not make comments about other people in the audience like that, if you could. Okay?

MS. BURTON: Dr. Wilds is here.

FACILITATOR CAMERON: That's right.

MS. BURTON: He is able to come forward and speak to this. I'm speaking the truth. These are public records. His name appears in this document as somebody who has spoken with the NRC and told them that the Department of Environmental Protection of this State favors this application and does not find that there is a problem with this plant causing cancer and other adverse health effects in the community. That is a lie.

And that is his name, and he is here, and he is now calling someone on his cell phone. And we are holding him accountable today and tomorrow and forever on forward because we have had enough of the lying. (Applause.)

FACILITATOR CAMERON: And other comments on the draft environmental impact statement?

MS. BURTON: I have many comments, and I will be presenting more in writing. But one in particular I'll point out, and then I will yield the floor to someone else. And that appears at page F-1 in a footnote, which is that the generic environmental impact statement -- and that's the document that in -- what is it -- 92 percent of the time the NRC said, "Because of what's in that document, we don't have to look at what is happening at Millstone, or has happened for 35 years or will ever happen, because of that document."

But if you go to the footnote, you will see that that document was issued in 1996, with an addendum that came out a couple of years later. Well, in 1996, that was before 9/11. That was before many of the proceedings at which the truth of fraud and collusion and corruption came out in proceedings in the courts in this State.

That was before there were disclosures by whistleblowers such as Jim Plumb about historic, willful, environmental violations at Millstone that led Northeast Utilities to plead guilty to environmental felonies in 1998.

This was before many of the people on the -- on a list that you are about to hear about came down with horrible cases of cancer and died. This was before Dr. Sternglass and Joseph Mangano and Dr. Sherman and many, many, many, many others have put their intelligence and their conscientious effort into understanding what has happened here, and found themselves drawn to the conclusion that this Millstone Nuclear Power plant is a menace.

We should not be bound by a document issued in 1996 -- that's the Dark Ages -- when prior to so much which has happened. (MPS-2-10) I would join with the gentleman from Southold in asking the NRC to disband these proceedings. They are flawed procedurally. If the population of Suffolk County -- and there are hundreds of thousands, and they were treated so rudely before, if not of course illegally by the Atomic Safety and Licensing Board, which refused to consider their application to intervene after the legislature voted unanimously to hire legal counsel to intervene.

They're right. They have a right to be here and to be heard and to participate. Just because Dominion sent checks without an explanation to legislators in Suffolk County isn't cause for this NRC not to notify the people of that community and give them an opportunity to be heard.

Thank you.

FACILITATOR CAMERON: All right. Thank you.

Cynthia, are you ready to give us some comments?

MS. BESADE: Yes. Just let me get my paperwork please.

FACILITATOR CAMERON: Okay. And we are running over, but that's fine. We want to hear from the rest of the people who have signed up to talk to us this afternoon. After Cynthia we're going to go to Melodie Peters, then Michael Steinberg, Mitzi Bowman, Peter Bowman, and Walter Parahaus. Is that the correct -- Parahaus? All right.

MS. BESADE: Good afternoon. My name is Cynthia Besade. I'm not a member of any group, coalition. I'm just myself. I'm just an individual -- an individual who lost their father a little over a year ago who was the most -- excuse me -- it's a little bit difficult to talk about this because of his loss.

(MPS-6-4) My father was a pipefitter at Northeast Utilities for over 20 years. He saw many violations of safety, and he became a whistleblower because he couldn't tolerate the way things were done at the plant any longer. He was fired for reporting those safety concerns.

I'm here today to talk for him, and for the 60-some people that are on this list, who have either lost their lives to cancer or are still dealing with the illness. I would say that it's -- approximately two-thirds of the people on this list are now dead.

You can go to the cemetery and see their stone, but you cannot see their face, and you cannot feel their hands, and you cannot feel their love and devotion to a community and to an area that was so pristine when we came here -- I, as a child, three and a half years old, where he brought

us to 5th Avenue in Waterford as it was a beautiful community and a pristine area on the water, so that his family and his children could enjoy the types of things that he did when he vacationed in Pine Grove as a child with his family.

Let me just tell you about a few people on my list. The first one, of course, is my father, who died at the age of 66 after fighting a virulent type of cancer that was hard to identify, which was identified in May and he expired the evening of August 16, 2003.

I must say that watching him suffer and fight the disease was the most heart-wrenching thing I've ever seen in my life. But to watch him die was the worst thing I've ever seen in my life. To watch him still fight for life when he knew that it was all over, it was difficult, and we had to reassure him that we would be okay, and that he could go.

The second person on this list happens to be his best friend, who suffered from brain cancer and died approximately in 1980 at the age of 50 years. He had several surgeries. He sat in our living room, and I served him coffee and refreshment as he enjoyed the company and visitation of my father.

Many, many of my father's and my mother's friends are afflicted. But more than that, more of my friends and family and their families are afflicted. We can go down the street, and just about every other household was affected.

As a young person, as a teenager, I was babysitting to raise some money, and I would take care of the children in the neighborhood. The first child I took care of was under the age of three, and he suffered from leukemia.

He couldn't play with the other children in the neighborhood because he -- his immune system was so compromised from the treatments that he was receiving for the leukemia that his parents had to fence -- actually fence him in or he would escape and go play with the other children where he was susceptible to picking up germs and things that would make him ill and threaten his life.

So to walk up and down the street where I would catch the school bus and wave at the young boy behind a fence. Literally, he was a prisoner in his own home.

Two doors down from his location there was a young girl nine years old who was my sister's friend where she had sleepovers. We had little parties together. We played at the beach. There were many, many fun times that we shared with that family. She died at the age of nine years from tumors on her spine.

She suffered greatly, but she accepted the fact and was a brave young soldier, much braver than I as I cried at her funeral. I could not believe that a young person could be taken from such a terrible and devastating disease.

As time went on, it wasn't much time, but more and more folks started to come down with certain types of cancers. But they seemed to be the same -- brain cancers in men, leukemia and lymphomas in children. We had many, many prominent people in the community lose their life to this devastating disease, people who had lived here and made this their home and brought their children up and enjoyed the same amenities that we did living in such a pristine area with all the natural resources available on the Niantic River, which left us to be less than two miles from the location of Millstone when it was built.

They came into the area and proposed that we were going to have lots of energy, lots of electricity, at a very cheap rate, non-polluting. You're going to have your streets basically lined with gold.

Well, as the people in the community went to work there, and took in the information that was given to them about their safety, they accepted that. (MPS-6-5) They accepted that working there posed some risk, and that they would be exposed to some types of radiation. But never were they told that they were not protected fully.

So on this list I have many workers that were there and are not with us any longer. Three of them happened to be in a department entitled Site Maintenance. (MPS-6-6) In 1993 -- excuse me, 1994, that department was deleted. Those people were met at the door and told that they had lost their jobs.

Why? Well, they talked about it being downsized. Well, in reality, three people in that department with brain cancer probably scared them to death, especially when two of them died. The third remains alive but does not enjoy the quality of life that any of us do. He can't walk. He is confined to a wheelchair. He cannot leave his home.

He was a loyal employee of the plant, went to work every day, vomiting, headaches. There is no treatment left that can help him. He has lost all of his function as a person that I knew and loved.

This goes on and on. Just across the street, I went to high school. My classmates developed cancers. Their parents developed cancers. They lived on Jordan Cove. They lived around the corner. They lived along Spidhead Road, Logger Hill, Niantic River Road -- the avenues as they are described, the small neighborhoods -- Misphan Court, 10th Avenue.

People that were ill and went on experienced a certain degree of remission until the cancer came back and took them. And when I was burying my friends at the age of 31, and watching their families left to figure out what to do -- how do we handle this? Who do we talk to about this?

Gee, it was my husband, and it was his father, and they were only separated by years apart, but they had the same disease and they both are dead, and they're both buried in the same plot.

Females that went on to have their legs amputated because bone cancer had taken them. Pardon me, at age 11 they developed this disease.

Many people along different avenues, but more importantly across Jordan Cove on Shore Road, picked up a lot. We had my friends, their fathers, dying from this terrible cancer, the same type of cancer developing in a father and in his son, separated no greater than a year -- many things such as Gail has -- Gail Merrill has informed you about, things that do happen and you cannot turn away from.

As I said, I'm just a citizen. I'm just a community member. I'm just somebody that knew these people. These are people that were in my life. They were my friends. They are people I went to school with and played sports with, and they're not here any longer. I have to speak for them. I have to make you aware of the fact that they have died and suffered, and their families continue to suffer, and the heartbreak goes on and on and on.

One brilliant young lady who went to law school but passed from liver cancer one month prior to graduation. It was another heartbreak to learn that her brother and mother accepted her law degree posthumously.

Now, these people are not just people that have done, and, you know, got sick and died. They could have been -- they were contributing members to the community. They were loved. They were entitled to life, not entitled to suffering and death.

People who owned businesses that no longer are in existence because their owner/operator has expired -- expired after suffering a breast cancer that left them lingering for years. This has been very cruel. We have people that were in the same family but maybe not in the same household but across the street and down the street and your next-door neighbor.

Then there were many, many people that I knew of indirectly, and I've added them to this list because they count. And, again, many of them are located on Seabreeze Drive. Why Seabreeze? Who knows? Why 5th Avenue? Who knows? The way the wind blew? We'll never know.

(MPS-6-7) We now know that the radiation that was released got into our water. We drank from wells. It became part of the soil that we grew our gardens in, and certainly it was in the air that we breathe, at times when they had scheduled releases of radioactive effluent, and then at other times that they had non-scheduled radioactive releases.

Twenty-two of, as I know, in the year 1978 when the facility tried to keep that quiet from -- that then Governor Grosso. Boy, when she found out, she was mad as a hatter, and she went right down.
And I don't exactly know what the outcome of that was, or what the punishment was, and the only reason that they even knew that they had these unscheduled releases was because people along the coast, the submarine base, people all the way to Maine had their monitors reacting, going off, and they were wondering, where is this radiation coming from? So apparently on those days the wind blew north.

Millstone has also been linked --

FACILITATOR CAMERON: Cynthia, are you almost finished?

MS. BESADE: I would say one or two more minutes.

FACILITATOR CAMERON: Okay.

MS. BESADE: Thank you.

MS. BURTON: Excuse me. I have to change a tape, if you don't mind.

FACILITATOR CAMERON: How long is that going to take, Nancy, because we really need to go on.

MS. BESADE: I'm sure it's -- she's got it in her hand.

MS. BURTON: Okay. Thank you.

MS. BESADE: Thank you. Once again, I just have another short comment, and I'll be through. Thank you for your attention.

Many of the cancers on my list involve children, as I've stated earlier. The list includes a high school student just across the street at Waterford High who was diagnosed last -- in the last couple of years with ovarian cancer. She survives at this time, but who is to say for how long. And tell me why a young person in the 10th grade should have to deal with something like that.

(MPS-6-8) To the extent that this exposure to radioactivity from Millstone was responsible for my father's death, and the deaths and illnesses of my friends and neighbors, these deaths and illnesses were avoidable. And something could have been done. We could have been told. We certainly could have been warned, not reassured that there was no threat to the public after any incident at the plant -- the standard line that's always given.

So at this time, I cite the reports filed with the NRC by the expert witnesses for the Connecticut Coalition Against Millstone that oppose the application for Millstone's renewed license. Why should we -- why should anyone -- any one individual allow them the opportunity to continue to commit the next generations, those that are not even born at this time, that will suffer the ill effects of the radiation, why should we commit them to another couple of generations of pain and suffering and gross disease?

So at this time I say if these deaths and illnesses were avoidable, the role of Millstone is unforgivable.

Thank you very much for your time.

FACILITATOR CAMERON: Okay. Thank you. (Applause.)

Can we have some of those for the -- do you want to put those on the transcript?

MS. BESADE: I will.

FACILITATOR CAMERON: All right.

MS. BESADE: Thank you.

FACILITATOR CAMERON: Melodie Peters.

MS. PETERS: I guess we're two minutes shy of saying good evening, and thank you for this opportunity, including the small section where my integrity as an individual and a lawmaker was challenged.

I am Melodie Peters. I'm a citizen. I'm a former State Senator, 12 years, former Energy and Technologies Committee Chairperson, and currently doing outreach work for Dominion.

I also am coping with cancer in my own family, and was a large part of the reason why I chose not to run again. So I'm not unfamiliar to the issue of cancer and how devastating it can be.

I have confidence in the process, and I have confidence in the expertise of the decisionmakers. And I'm speaking to you gentlemen because I'm assuming that you're the reason why we're having this public hearing -- the ability to be able to testify.

(MPS-14-1) First, let me say I appreciate and support the preliminary recommendations of the NRC staff, which states that the Commission determined that the adverse environmental impacts of license renewal for Millstone are not so great that preserving the option of license renewal for energy planning decisionmakers would be unreasonable.

The State Department of Environmental Protection, recognizing the importance of these plants as a valued energy source -- and I think this was said earlier -- equivalent to 48 to 50 percent of Connecticut's power needs met by Millstone while being clean, efficient, and least costly.

I didn't laugh during your testimonies, and I expect the same respect.

Chose to extend the 1997 operating license while continuing to resolve the reactor cooling issues. I have been told these deliberations are much further along than the last time we met in May and that are nearing completion.

Some of the characteristics of Dominion that I personally admire includes their willingness -- I'm so angry right now I can't even see straight, so I'm going to stick to my text, because I have sat here along with the rest of you since 1:30, being patient, feeling as though I have been criticized and I don't feel like the same respect is due.

Some of the characteristics that I personally have for Dominion that I admire includes their willingness to comply, to problem-solve, and to explore good, sound, and progressive alternatives to avoid future negative environmental impacts and to promote good environmental practices.

An example is Dominion's partnership in the Long Island Sound Foundation, Dominion's thoughtful approach to dry cask storage for spent fuel, and its willingness to study winter flounder.

It is my opinion that Millstone contributes in a smaller way -- this is a personal opinion, different from what others may want you to believe -- in a smaller way, to the demise of our winter flounder. But because they are the big guerrillas, Millstone becomes the easiest target. And they are willing to step up to the plate and make the changes that are necessary.

I sincerely hope that this issue is addressed comprehensively. Millstone 2 and 3 have demonstrated a longer run time in the history of the plants due to the uneventful operations

translating to safety and efficiency. What this means is that Units 2 and 3 generated the equivalent of 90 percent of the power in the same timeframe than when all three units were up.

(MPS-14-2) Recently, the American Society of Mechanical Engineers endorsed nuclear power as a safe and efficient source for supplying energies, and addressing our growing needs. Aside from my own support for renewable energy -- and my record over the 12 years certainly indicates my support for renewable energy, including the restructuring bills.

(MPS-14-3) Aside from my own, the engineers state that most renewable energy sources are expensive, unpredictable, and dangerous to the environment. Nuclear energy could be vital to addressing these environmental issues without creating others.

It states in the generic environmental impact draft executive summary, "If the Millstone operating licenses are not renewed, and the units cease operation, the adverse impacts of likely alternatives will not be smaller than those associated with continued operation of Millstone. The impacts may, in fact, be greater in some areas." And over my years of expertise and research, I concur.

Finally, our needs for energy continue to grow as we develop economically and certainly technologically. Locating and building new generation plants of any kind becomes problematic because of the NIMBY attitudes -- not in my backyard -- the NIMBY attitudes coupled with the state and local restrictions.

Extending the license of already safe and efficient plants seemed to be the wisest thing to do.

And I thank you for your time.

FACILITATOR CAMERON: Thank you, Melodie.

Okay. We have Michael Steinberg at this point. And we have another meeting coming up, open house starting at 6:00. So I'm going to try to adjourn this at 5:30 at the latest. So we have a few more speakers, and I would just ask you to try to be as concise as possible because we are --

MR. STEINBERG: I have a lot to say, but I'll try to be as concise as possible.

FACILITATOR CAMERON: Thank you, Michael.

MR. STEINBERG: Can everybody hear me? Is that better?

FACILITATOR CAMERON: Good. All right.

MR. STEINBERG: Okay.

FACILITATOR CAMERON: This is Michael Steinberg.

MR. STEINBERG: Yes. I'm Michael Steinberg, and I'm from Niantic, and among other things I'm a writer specializing in investigative journalism, and I've looked into -- done a lot of stuff about Millstone. I'm the author of this book "Millstone and Me: Sex, Lies, and Radiation in Southeastern Connecticut." So my point of view should be obvious.

I have an article that just came out in Z Magazine, a national magazine from Woods Hole, Massachusetts. And the article is called "New Nukes," about the U.S. nuclear power industry staging a comeback, and it wants you to pay for it.

And Dominion is one of the leading players in this development -- attempted development of new nuclear plants. So as I said, I'm from Niantic. My family so far has been living in Niantic for five generations. My great-grandfather -- my great-grandparents came over from Scotland, and my great-grandfather, George Kirk, was -- worked in the quarries in this region, including at Millstone, the Millstone Quarry which was very prominent in its day. The quarry is now the discharge canal for Millstone Nuclear Power plant's radioactive -- liquid radioactive waste.

I want to respond to some of the things in the draft EIS, but before that I want to introduce some new material that we've become aware of since that time. Joseph Mangano from the Radiation and Public Health Project gave us some material recently. Mr. Mangano has been interviewed and profiled in The New York Times, USA Today. And the Radiation and Public Health Project has also been interviewed on National Public Radio, among other media coverage.

(MPS-3-2) Mr. Mangano's recent information is that local health declines when Millstone opens improves after closing, in which he reports that the cancer instance rate in New London County was 8 percent below the State in the '50s and '60s before Millstone opened.

After Millstone began operating in 1970, this rate has risen steadily until now it has reached a level 6 percent above the State rate. So that's going from 8 percent below to 6 percent above. So he -- Mangano says that of the over 1,300 New London residents diagnosed with cancer each year, nearly 200 can be considered in excess of what would be expected if earlier levels had been maintained.

So I'm not saying -- you know, nobody I don't think is saying that Millstone is causing all the cancers in New London County, but because of its radioactive emissions it is causing this excess amount, and it's at -- in the historical 35 years it's been going on.

(MPS-3-3) Mangano also reports that about -- infant mortality deaths of children one year and younger. In 1994 and '95 when Millstone was operating, there were 136 such deaths, unfortunately. When Millstone closed -- was closed, pretty much for all of '96 and '97, that rate dropped, and then the number dropped to 105. And it goes into a little more detail in the report I'm going to submit to you after I finish speaking.

One second, please.

(MPS-3-4) This makes it all very, very plain, the way he lays it out. '94/'95, Millstone was operating at 80 percent capacity, and there were 136 deaths, the rate of 7.41. '96/'97, it was only operating at 10 percent. The deaths dropped to 105, which is -- the rate dropped to 6.07, which is over an 18 percent drop.

Now, when they started up again in '98/'99, at first they operated during those years 50 percent. The rate was minus 3.1 compared to minus 18.1, so that's quite a difference. And then, in 2000 and 2001, when Millstone was operating at 90 percent, the rate actually went up 8.8 percent. So that's from minus 18.1 to plus 8.8.

And so I'm going to submit this report to you. (MPS-3-5) It also talks about the tooth fairy project, where this group has been testing Strontium-90 in children's teeth. And what it has found in Connecticut so far is that Connecticut has -- along with Pennsylvania has the highest amount of Strontium-90 on average of the six states that they've tested so far.

And as far as the counties near nuclear plants, which are Fairfield near Indian Point and our county, New London, near Millstone, they have the -- an average concentration, 180 percent more, which is more than double that of the other counties in Connecticut.

And it's known that Strontium-90 doesn't exist in nature, only enters the environment and our bodies through nuclear weapons fallout and nuclear reactor emissions.

(MPS-3-6) Also, what I was trying to talk about before -- Dr. Sternglass sent the NRC a declaration last August which wasn't included in their consideration of the evidence about human health and radioactive emissions, the possible effect on human health. So I'm going to -- you should already have that, but I'm going to just read a few short things out of it to see why I thought it was so important that it needed to be considered.

He says, "I'm a Professor Emeritus of radiological physics at the University of Pittsburgh School of Medicine. I have written and published extensively in the area of low-level radiation in human health, and about the adverse effects of radioactive emissions from the Millstone Nuclear Power Station in particular."

He's the author of a book "Secret Fallout: Low-Level Radiation from Hiroshima to Three Mile Island" published by McGraw-Hill in 1981. He has testified before Congress on this subject. And in brief, what he has -- (MPS-3-7) what he goes on to say is that there is a causal relationship, which the NRC denies between Millstone's radioactive emissions over the years and negative health effects.

As he says, "It is my professional opinion that the radioactive releases from the Millstone Nuclear Power Station, since its startup in 1970, have caused and will continue to cause excess infant mortality, as Joe Mangano just showed us, low birth weight babies, leukemia, and cancer, as well as increased rates of both chronic and infectious diseases in the towns around Millstone as well as in New London County, and Connecticut as a whole." And he goes on in great detail about how he has come to that conclusion.

(MPS-3-8) So I'm going to address now the things in the draft EIS that gave me problems, because at the last meeting I submitted a number of documents pointing to negative relation -- negative health effects from Millstone's radiation. And one of them was cancer incidence in Connecticut counties, 1995 through '99, from the Department of Public Health, Connecticut Tumor Registry, which indicated that during those -- that period, New London County had the highest rate, age-adjusted rate of incidence of cancers, in the State.

And as I also reported before, it had the second highest such rate for males, not to exclude us. It was basically in a statistical dead heat with Tolland County.

Now, in the draft environmental impact statement, it didn't report the fact that males were second highest. And as I stated at the hearing, that they were basically number one also. So we're showing the highest rates in the State, and this is the most current information from the Tumor Registry. Why is that?

I also reported that that report went into specific kinds of cancers, and compared the rates between different counties in Connecticut. And for the number ones, the NRC report characterized them as several.

Now, if I went to Dutch's Tavern in New London and -- you know, to have a few drinks, and I got pulled over by a cop on my way home and he said, "How many drinks did you have tonight?" and I said "several," and he said, "Could you be more specific?" and I said, "Well, actually 12," you know, I don't think he'd be too happy about that, because (MPS-3-9) that's how many number ones New London County had including breast cancer, cervical cancer, uterine cancer, other female genital cancers; liver cancer for males, bladder cancer for males and females, and colon and rectum for females, colon females, totaling 12.

There are six more number twos, five more number threes, seven number fours. (MPS-3-10) And also, I presented a document called "The Radiation Compensation Act," an act of Congress in 1990 that compensated people who were downwind from nuclear testing in Nevada and Utah and Arizona, and as well as uranium miners who were -- basically said that these people were injured in the interest of U.S. national security, and they should be compensated.

And it specified specific kinds of cancers and what -- which establishes a causal relationship, once again, between low-level radiation and specific kinds of disease. In this case, there are too many of them that are on the list of -- where New London County in the Tumor Registry report was number 1 through 4.

For instance, liver cancer, which was the number 1 for males, breast cancer number 1, and multiple myeloma in which for females in the county was tied with Fairfield for number 1, and thyroid cancer number 3.

FACILITATOR CAMERON: (Inaudible comment from an unmiked location.)

MR. STEINBERG: Yes, I understand that. How about three to five more minutes?

FACILITATOR CAMERON: We really -- I mean, we really --

MR. STEINBERG: Well, this goes to the heart -- this goes to the heart of the problem with the draft EIS. I'm just going to skip on to something else that's important to me.

PARTICIPANT: (Inaudible comment from an unmiked location.)

MR. STEINBERG: Okay. Let me -- I'm not going to finish up quite yet, but I have -- next I'm going to talk about (MPS-3-11) in the draft EIS on page 243 it says, in relation to radioactive-type stuff, "The applicant does not anticipate any significant changes to the radioactive effluent releases of exposures from Millstone operations during the renewal period. And, therefore, the impacts to the environment are not expected to change."

Now, unfortunately, from -- this is from Dominion's annual radiological environmental operating report from 2003, where it's talking about Tritium, which is radioactive hydrogen. It says, "Since the restart of Unit 3 in 1998, and Unit 2 in 1999, Tritium releases in liquid effluents have risen to levels at or above those observed in the pre-shutdown period."

Now, the Tritium releases into Long Island Sound are at record highs for Millstone. And so that doesn't agree with the conclusion of the NRC, which says they're going to stay the same.

Now, when Mr. Emch and I talked after the meeting last May, I raised this concern with him, and he informed me that there are filters that could be put on so that the Tritium levels could be lower, and that they're expensive.

But I think it's incumbent that Dominion take action right now. We know in the past that they've taken such action. Unfortunately, they had to be coerced into it -- as I learned from this report, a corporate profile of Dominion resources by public citizen in Washington, D.C.

(MPS-3-12) They violated the Clean Air Act and, in April 2003, Dominion -- VEPCO agreed to a $1.2 billion enforcement settlement. $1.2 billion -- that's about the same as they paid for Millstone -- with the U.S. Department of Justice and the U.S. EPA for violations of the Clean Air Act.

The EPA charged VEPCO with failing to obtain the requisite permits for significant modifications it made to its coal-fired power plant in West Virginia that resulted in increased power generating capacity. The Clean Air Act requires that such modifications be accompanied by the installation of pollution control equipment to mitigate environmental contamination.

Well, VEPCO neglected to install such equipment, which according to the EPA resulted in the release of "massive amounts" of sulfur dioxide, nitrogen oxide, and particulate matter. So, obviously, they're not going to do it of their own free will, if they did that kind of massive pollution in West Virginia.

But it's incumbent upon the NRC and the State Environmental Protection Agency to have this filter -- these filters installed immediately.

(MPS-3-13) I'm against the operation of Millstone right now, and I certainly don't think it should be relicensed. But -- and this -- any relicensing application that has come before the NRC has been approved. It's really just a rubber stamp process. And so I -- I'm afraid it's going to happen against my will and the will of many other people.

But it should be made a condition of the relicensing as you rubber stamp their application, that they put on these filters right away, because the position of the nuclear industry is to operate at maximum capacity. The more these Unit 2 and Unit 3 operate because of their design, the more Tritium is going to get poured into Long Island Sound.

Just as an example, in 2003, the operating capacity of Unit 3 was 99.8 percent. And for Unit 2, it was 80 percent, but that was only because it had to shut down for refueling.

I have a lot of trouble with all of the -- and I'm going to wrap up now. (MPS-3-14) I have a lot of trouble with all of the -- this entire Section 4.7, evaluation of potential new and significant information on the impacts of operations during the renewal.

I gave one example with a document about cancer rates from the Tumor Registry report. But it -- other information that I presented was not represented accurately, which, I had more time, I would go into. And all in all, it indicates to me a bias on the part of the NRC in favor of the nuclear industry. And that was characterized by the fact that -- how they treated the information that I presented.

(MPS-3-15) But the fact that Dr. Sternglass' declaration from last August was somehow not considered whatsoever, and the fact that the NRC consulted with Dominion, with Department of Health here, the Department of Environmental Protection, who basically all have the same position on this issue. They're talking to themselves, where nobody talked to Dr. Sternglass, nobody talked to Joseph Mangano, or anybody else in the Radiation and Public Health Project.

And so you're not really representing the public when you don't talk to people who have a different point of view, which is the whole point of why we're here, because these people are presenting evidence that shows why our loved ones are suffering these diseases here.

And so until there is some great reform or the NRC is abolished, along with the nuclear industry, we're not safe, and we're right back where we were in 1995, 10 years ago, when everybody said -- all the people in power said, "Everything is okay." John Roland came to Millstone and said, "Everything is safe there."

And then -- then they had to be shut down, you know, for over two years, and you had to plead guilty to 20 Federal felonies and pay one big, old fine, etcetera, etcetera. So the same game is going on; the face has changed. But this game has gone on too long. This game is over.

These plants need to be shut down, and it's criminal to relicense a place like Millstone.

Thank you. (Applause.)

FACILITATOR CAMERON: Okay. And you're going to give us some things for the record, which we'll appreciate.

We have two final speakers. Mitzi Bowman, would you like to come up? Then --

MS. BOWMAN: (Inaudible comment from an unmiked location.)

FACILITATOR CAMERON: No.

MS. BOWMAN: No?

FACILITATOR CAMERON: I don't mind if he goes first.

MS. BOWMAN: You don't mind. Okay.

FACILITATOR CAMERON: No. This is Peter Bowman, and I know that if we need to pay attention to -- more attention or explain better why we didn't respond to comments last time, we'll do that.

There's been a lot of talk about the tooth fairy study. There is an NRC background publication on the table back there that also talks about the tooth fairy project, for those of you who are interested in seeing it.

And, Mr. Bowman, thank you.

MR. BOWMAN: My name is Peter Bowman. I am the coordinator of a group that is based in New Haven, Connecticut. It's called Don't Waste Connecticut. We've been involved in energy issues for many, many years, and we're part of the Coalition Against Millstone. (MPS-4-2) And we certainly will not subscribe to this impact statement that's being presented today.

I have two or three comments on what I heard, and, by the way, I would just preface my remarks by saying that Dr. Sternglass and Joe Mangano have been mentioned a number of times, and are certainly very, very valuable resources, but I would say we have a resource center in New Haven, and I have a whole list of papers that have been published in peer review journals on the effect of low-level radiation on health.

I don't have it with me, but if anyone is interested, they could see me and I'll try to get a copy of these papers to them at some point.

The first thing I'd like to talk about is the ICRP, the International Committee on Radiation Protection. It was mentioned earlier in the presentation that the releases from Millstone were based on the fact that IC -- that we're well within the ICRP limits.

Well, the ICRP -- the International Committee on Radiation Protection -- is a self-appointed body, mainly from the nuclear industry, and along with UNSCEAR, which is the United Nations Scientific Committee on the Effects of Atomic Radiation, they have been the main setters of standards in the world for the last 40 or 50 years.

They base their findings mainly on the victims of Hiroshima and Nagasaki and the health effects that occurred after the bombs were dropped on Japan. But since then, (MPS-4-3) there has

been very much research done at the cellular level, which has shown -- and this is pointed out in the BEIR V, which is the National Academy of Sciences -- the Biological Effect of Ionizing Radiation -- in BEIR V, they make the statement that any -- any amount of radiation can cause harm.

So a single ionizing event of radiation can cause harm, and that's what is being looked at at the cellular level. And at this point it's being shown that the ICRP and those bodies that are setting the standards are 100 or even 1,000 times off the base.

And where we couldn't account for many of the leukemia and cancer clusters in various parts of the world, it's shown that if you discount ICRP and start to look at some of the cellular research, such as the bystander effect, which is where an ionizing track passes by a cell, a nearby cell, it doesn't have to touch the cell, but the energy given off will affect the cell.

And then we have the second event theory put out by Chris Busby in England, whereby DNA -- the DNA is hit by an ionizing particle and a second event occurs within a short period of time before the cell can -- the DNA cell can repair the damage, and then it mutates.

These have been shown -- this research has been shown to account now for these cancer clusters that we see around nuclear facilities. And I would urge people to go beyond the ICRP and UNSCEAR and look at some of the more recent research.

In the UK now, they have the -- in Europe, I should say, they have the European Committee on Radiation Risk, which looked at the ICRP model and found it's badly flawed, and we should be looking in other directions at that, which they are doing.

Another thing that came up was the question of cost benefits, and what wasn't mentioned, at least I didn't hear it, was Price Anderson. Now, as most of you in this room know that Price Anderson -- Price Anderson Act was initiated in the '50s, which allowed the nuclear power industry to go operate.

The nuclear power industry didn't want to operate, because of the liability, because of the unknown factors that were -- that was in there, not just after the use of the bomb, etcetera. And the Price Anderson Act covers the insurance to a certain degree of the nuclear industry and let's them off the hook for liability.

And I think someone pointed out earlier that you can find that out ,if you look at your homeowner's policy, or your automobile policy, you'll find that they have exclusionary clauses in there which they will not pay you one cent for any damage that's caused by radioactive contamination.

So your home, your automobile, and all of your possessions, if they ever become contaminated from a release from Millstone or any other place, you won't get one penny for it.

(MPS-4-4) Price Anderson -- I don't know what the fund is now, but it's probably around $9 billion. But it's been estimated that an accident on the scale of the Chernobyl accident, or something like it, probably runs into $3- or $4- or $500 billion. And so there's no cost-benefit there, and that's not even mentioned in this impact statement.

(MPS-4-5) And the other question was evacuation. I always laugh at evacuation, because as far as I know, there has never been -- in a nuclear plant in this country, there has never been a full-scale drill as to what evacuation would -- how it would occur. I know they have had drills with the first responders and that type of thing, but the public, who are the people who are supposed to be protected by this evacuation plan, have never been involved in an evacuation plan.

And when you think about it, when they talk about the 10-mile limit, how could they be? Is the radiation going to stop at some invisible wall at 10 miles, and the person living 10.1 miles away is going to sit in their house while the other 50,000 people are running down the road? I don't believe it.

Anyway, it's getting late. It's been a long day. And I -- that's about all I've got to say for now. But don't -- don't use the ICRP model as your model for radiation. That's my main point.

Thank you.

FACILITATOR CAMERON: Thank you, Dr. Bowman. Watch your step. (Applause.)

Mitzi?

We have one more. Mitzi. Our final speaker is Mitzi Bowman, and we'll try to put the microphone so that it's easy to use here.
Mitzi, how is that?

MS. BOWMAN: Thank you. There isn't too much more to say. Well, there really is, but there's not much more time. But I just wanted to talk to the love affair between the corporations that produce this poison and the government agencies and agencies such as the DEP and the EPA and the ICRP -- this love affair between them that allows these lies to be told.

And it looks like the reason for what's going on now, the extension of licenses, is that our administration right now has said that they want about 50 -- at least 50 more nuclear plants in

the country. And they're going to need time, because it takes a long time, especially when people like us get up there to fight back -- it takes a long time to build these plants.

And I think they need these extensions of licenses in order to give time for a new wave of nuclear power,(MPS-5-6) where all the money and subsidies, our taxpayer subsidies -- including the Price Anderson Act -- will be going to these new plants, costing billions and billions of dollars, while that money, if we needed that much subsidy -- if we had that much subsidy going to clean energy, energy efficiency, solar, and wind, we wouldn't need a single oil plant or a nuclear plant. We could have a whole country filled with clean energy and no cancers from it.

And by the way, I was told to mention -- I'm sorry, Pete -- Pete, too, has metastatic prostate cancer. So we are all suffering from this, and you guys who are promoting it should be ashamed of yourself. Look into your consciences.

And I have a lot more to say, but I'm not going to say it now. Thanks. (Applause.)

FACILITATOR CAMERON: Thank you, Mitzi. And thank all of you for your comments and patience. And, Andy, would you like to just close it out for us? Thank you.

MR. KUGLER: Obviously, I want to be very brief at this point. I'd just like to thank everybody who did come out today. I want to thank you for your patience. It has been a long afternoon, but we did want to hear what everybody had to say.

I want to remind you that if you do have other comments on the draft environmental impact statement, you can submit them either in writing or by e-mail through March 2nd. And we will be staying around after the meeting has ended. If you have any additional questions or if you want to talk to members of the staff, we'll still be here.

And with that, I just want to say, again, thank you for coming.

FACILITATOR CAMERON: And we'll be back at 7:00 for a meeting tonight, and 6:00 open house.

Transcript of the Evening Public Meeting on January 11, 2005, in Waterford, Connecticut

MS. MERRILL: Excuse me. It's not a 12-fold increase. (MPS-15-1) It's 12 different cancers, the highest of which are around Millstone Nuclear Reactor because New London County has the highest cancer.

So I said to you, given these findings, I don't understand how you could say that there is no big link between cancer and Millstone.

MS. BESADE: I'm Cynthia Besade from Uncasville, Connecticut.

(MPS-16-1) I would like to ask you, how did you analyze the data from the Tumor Registry and come up with what your conclusion is? You just stated that Waterford had one of the lower stats. Well, that stack is several hundred feet high. So whatever is coming out of that is getting into whatever prevailing winds are at that level and traveling.

How did you analyze those statistics and come up with the fact that you don't think that there is any correlation between your emissions of radiation and cancer in this community?

MS. HERBERT: This is a follow-up. (MPS-17-1) I'm wondering, what geographic area did you decide upon on this issue and why? I mean, you're saying Waterford. Millstone is close to a lot of communities.

MS. WINSLOW: My question is about this study with Haddam Neck. (MPS-18-1) Haddam Neck shut down in 1996. And, besides which, it was only one reactor, and we had three operating here. So the study is totally irrelevant to Waterford and Millstone.

MS. WINSLOW: (MPS-18-2) I noticed that you talk about things that could happen with the reactor, but you don't mention any fires in the spent fuel pool or any act by a malicious individual on the spent fuel pool.

And those are accidents that would still be possible with Millstone in the license renewal period, whether it was in the wet storage of the proposed dry cask storage.

MR. SCHWARTZ: I want to address what you just said and what that gentleman just said. But (MPS-19-1) it is an environmental impact if a terrorist attack, for example, releases -- and I have a big problem. That is my principal concern for coming tonight. The gentleman up there said you cannot quantify it, and that is correct.

But I think that the way I would quantify it is very high. You quantify it looking pre-9/11 in the report. And you use the word "small" and you define small. I think that is a big error.

I realize that the NRC is addressing it, but I think that it has to be in an environmental impact statement because it is the biggest threat to the environment, far greater than any of these SAMAs.

MS. WINSLOW: Just I wanted to go back to where I was before. (MPS-18-3) Aside from the malicious thing I brought up -- I'm sorry I did at this point -- I still feel that the spent fuel pool having an accident on its own without anybody provoking it is still not a severe accident in your report. And so I have a contention with that.

MS. WINSLOW: (MPS-18-4) My point is you are adding 20 more years of spent fuel to this mix of what you have already got. So it is going to increase the risk.

V. PUBLIC COMMENTS

FACILITATOR CAMERON: We're going to go to public comment now, but let us make sure that this microphone is working.

Okay. We're going to listen to some of your more formal comments at this point. There were issues raised during the questions and answers. There were also comments. And we will look carefully at those to make sure we consider those as comments.

Betsy Ritter, Representative Betsy Ritter? Is she here? Betsy? Come up here. I'm sorry.

MS. RITTER: Thank you. I will mostly be brief because it is my understanding it's continuing to snow. I want to just start by thanking the NRC and the Town of Waterford for the time that they have put into allowing this to be here in the host community as well as making provision to allow everybody the time this afternoon and this evening to come in and comment.

I also want to thank everyone who came tonight because it is a very important part of our process that this be very public and very open. The questions that you raise are important to the process. And, one way or another, I think that it's a critical affirmation of the openness that we are trying to achieve here.

(MPS-20-1) I want to speak in support of the relicensing effort by the power plant. The Town of Waterford, the surrounding communities, as well as the State of Connecticut have very clearly benefitted from its presence here in Waterford for many years.

I know that this is a very lengthy process and I think that it -- and it is an expensive process, of course, for everybody, the State, the town, emotionally. We have heard a lot of testimony tonight to that effect. And it's a sort of, as I said, a tribute or an affirmation to our process we let that happen, but I also feel very strongly that, as I said, not just the town and the communities, but the State are benefitted by the presence of the power plant and the extension of the license.

(MPS-20-2) One way or another, we need electricity. We need electricity to conduct our businesses. We have set up a huge infrastructure. Our huge way of living is dependent on this. And we can continue to explore the many, many other alternatives, alternate power sources. And we should do that, but it's undeniable that, certainly at this point in time, this is what we have to go ahead and do. And I want to support it.

Thank you.

FACILITATOR CAMERON: Thank you, Representative.

Next we're going to go to Brian, Brian Vachris from the Town of Waterford. Brian?

MR. VACHRIS: I'm glad everyone could show up tonight. I'm Brian Vachris. I'm on the town Board of Finance. I'm not officially speaking for the board, but (MPS-21-1) we do have some concerns about the fact that there would be a tremendous loss of tax revenues if these plants were to close.

I might also mention that I'm a nuclear test engineer at Electric Boat Corporation. So I am a little bit familiar with the design and operation of these plants.

I haven't had time to review the 2,900 pages of submittal that were in the application. If I do see anything that I need to comment on in writing, I will do so before the date. I don't know that I will, though. The parts that I have read look fine to me.

One of the statements that was made earlier perhaps should be slightly corrected regarding the town's finances. Low rates are based on the grand list, not just on tax revenues because some taxes come from other sources of taxation, such as income or sales tax, and are distributed by the State from the State general funds.

(MPS-21-2) As far as the town goes, Millstone currently represents about 51 percent of the grand list. And there we're looking at property taxes. So effectively if the plant weren't there, the tax rate would be doubled, projecting forward to 2015. It's about the 34 percent of the grand list.

So, again, the tax rate that we're projecting for that year forward, which are kind of far-out projections, would be 50 percent higher. And at the town's current level of expenditures, we would see tax rates and mill rates in the high 30s, just so that all of you who are residents of Waterford are aware of the importance of the power plants to the town in terms of its tax base.

I guess one of the other things that I might say is that there are a lot of people in this community who are familiar with the nuclear industry. They are not only the employees at Millstone, but they're also employees at Electric Boat and people who are employees at the local submarine base of the United States Navy.

(MPS-21-3) This community supports nuclear power. And there are people. And I have been in some of these hearings before, and I have seen some of these people before who are very much against it. But the bulk of the community and those of you who have run for public office and have gone door to door in this community -- I know several of you who are here know that there is no widespread opposition to nuclear power in this community.

So I commend the NRC staff for being here. Thanks for listening. But know that you have a good and favorable host community here. (MPS-21-4) And I do hope that to the extent technically feasible, you will extend the licenses of these plants as long as possible.

Thank you.

FACILITATOR CAMERON: Thank you.

And Geralyn Winslow is our next speaker.

MS. WINSLOW: I've got a lot of stuff here. I need to go through this comment book because I have little sticky notes in here that have comments that have to do with this report. And I need to look through there.

I only have five minutes or how long can I –

FACILITATOR CAMERON: Five minutes is a guideline. If you go over a couple of minutes, that's fine.

MS. WINSLOW: Okay. I received your little report in December, about two weeks before Christmas, when I had a few other things to do. And I've tried to go through it, which I have. And I do have a lot of things to say.

If I could go through the book and sit down one on one, it would be the preferred option of talking about what I have seen in this report. And I'll try to go over the things that I have said here.

Do you want to talk about new information versus old information in the book? It seemed like everything I had said at the May 18th meeting was old information. I'm sorry that it's old information, but it's still pertinent.

(MPS-18-5) There is new information, which I have today to submit. And it's from Joseph Mangano from the Radiation and Public Health Project. He sent me these graphs, which show all of the local health declines when Millstone opens, improves after closing. And he has all of these graphs.

I'll just submit them. I won't go through them all here, but this one is the thyroid cancer. It's so obvious I just have to show it.

So this is the new information that I have to offer today. And I still want to go over a little of the old information and some of the things I saw in the report.

(MPS-18-6) Small, medium, and large. You guys spoke about that. It's meaningless. It's all relative. And, really, to say an impact is small, you have no figures or no numbers. It's all through the book. It really doesn't mean a lot to me.

And then I'll just go through the book and where I wrote things down about the water. (MPS-18-7) And the fact is that Millstone uses massive amounts of water, which you guys did mention, to coolant systems. And chemicals must be used to keep its water system functioning.

I said this at the May 18th meeting. It was not mentioned tonight, (MPS-18-8) but I still would recommend that Millstone build the cooling towers, especially after reading this report. It would save some of the fish and other wildlife in our area.

(MPS-18-9) The water does go back into Long Island Sound. And it's full of tritium. And the more that the plant runs at full power, the more tritium gets put back into Long Island Sound. That's not new, but it's a fact, and it's an environmental fact.

I'll just say when I went through the book, I wrote down "impingement." I wasn't sure what that meant. And it's a nice little term that means kill, kill the fish and other living organisms. And it might be small, but it still happens.

(MPS-18-10) I did look at this on the environmental impacts and the geographic distribution and having to do with environmental justice. And you claim that, again, you say it's small, the impact of environmental justice on the people that live around Millstone, but what it doesn't look at is the whole picture because in justice, environmental justice, is caused when the low-level waste is shipped to Barnwell, South Carolina and it's environmental justice when the uranium that's used to make the fuel is mined on Native American land and when the waste goes out to the goat chutes in Utah. That's environmental justice. And it does happen. It's not part of this report.

Also, as far as this report goes -- and I heard a lot of it tonight -- (MPS-18-11) I don't understand why socioeconomics is part of this report. It's an environmental report. Do you mean socioeconomic environment versus a natural environment? Because the emphasis in the report is on socioeconomics. It is not the NRC's job to be concerned with the economic impact of relicensing. And you did mention that you have to have that.

My comment on this aspect of the report is a strong objection to the emphasis placed on the economic impact of relicensing. Okay.

And, finally, (MPS-18-12) the obvious objection I had to this report is the separation of the waste issue from relicensing. And I did get to speak about that a little bit. High-level waste is a major problem that our government can't seem to solve in the nuclear industry.

This report, in typical NRC fashion, obfuscates the truth with its vague language and overwhelmingly useless data meant to hide the truth that have been presented here in these reports and today by the Coalition Against Millstone as well as the information that I had stated at the May 18th meeting.

Today we have new information that nuclear plants are causing harm to our families and our precious environment. And I'm standing by the old information that I have submitted and continue to object to the license renewal at Millstone Nuclear Power Station. But mostly as a person, as a citizen, (MPS-18-13) I'm saddened by the thought of 20 more years of Millstone operating and saddened for future generations, which will be adversely affected by our need and our greed for more nuclear electricity.

Thank you for my chance to make these comments.

FACILITATOR CAMERON: Thank you. (Applause.)

FACILITATOR CAMERON: Thank you for those specific comments, Gerry. And I would just remind everybody that the comment period is until March 2nd to submit further written comments.

I believe just one clarification is that the -- and I'll let my colleagues correct me on this if I'm wrong, but the NRC, like any other Federal agency, is required under -- the requirements to do an environmental impact statement has to include a socioeconomic analysis as well as impacts on the natural physical world.

We have Doug Schwartz. Mr. Schwartz?

MR. SCHWARTZ: I just want to follow up on a couple of points the previous speaker made. I'm not sure if the intent is to obfuscate, but it certainly appears that way. And I think part of the problem is because it needs to be run by an English major, rather than be written by engineers, the report.

(MPS-19-2) In one instance, the way numbers are handled, $1.5 times 10^9, when I have no idea whether that was an attempt to obfuscate or just an engineer writing that, but it should have been one and a half billion dollars for the cost of the catastrophic cleanup.

Another instance, the speed in which evacuation could happen was listed. There would be a delay of 7,200 seconds. It's in there. I'm sorry. Normal people use two hours. And as a

constructive criticism for the NRC, if you don't want people to think you're obfuscating, don't use that kind of language. Have an English major clean it up.

(MPS-19-3) I have a big problem with the Commission's standpoint that the staff basically at this level isn't going to deal with the clear terrorist threat to the nuclear power plants in the country. And so my comments are generic about that. And they're specific about the threat to Millstone.

I think it's silly to do an environmental impact statement without quantifying, although it can't be quantified, the threat from terrorists and give it a very big role.

Five years ago, if someone did something comparable to an SAMA on the World Trade Towers, the engineers would have come back and said, "Very little chance of them ever collapsing." But three years ago, we know that there was a big chance of that happening.

The way I calculate it, Millstone is probably one of the ten leading terrorist targets in the country. And I'll tell you how I get there.

In any interview that Khalid Sheikh Mohammed gave in -- I believe it was for the first anniversary. He gave it with al Jazeera of September 11th. He said that they had talked in the latter part of the 1990s. They had planned initially not to attack the World Trade Towers. They had planned to attack nuclear power plants, but they were afraid that, quote, "it would get out of hand," end quote.

Now, what did he mean by that? I think he meant that their experience with doing relatively small and rationing up attacks on America, that there wouldn't be any overwhelming response. Well, it did get out of hand. And the World Trade attack was sufficient to trigger an overwhelming response from America.

Number one, they had planned to attack nuclear power plants, but they skipped it and went to the World Trade Center. Number two, there is some intelligence on September 11th the flight that went down in the field in Pennsylvania was either targeting a building in Washington or that they would go after a nuclear power plant.

Then the NRC issued a memo on January 23rd, '02. They had a senior al Qaeda member in custody. They interrogated him. He said that they were going to use planes to attack nuclear power plants and that there were already three people on the ground in the U.S. to facilitate those attacks.

In December of '03, you'll recall there were some flights cancelled coming over from Britain and France. On January 4th, '04, the Sunday Times of London reported that the intelligence behind those flight cancellations was that power plants were going to be attacked by jets on the East Coast.

Now, if I'm not mistaken, I believe there are two to the east of us in New Hampshire and Vermont. And I don't think anybody thinks that the terrorists are going to attack power plants in New Hampshire or Vermont. But with Millstone, you get the trifecta. I would think that Millstone and Indian Point are very prime targets and Millstone especially because it is on the flight path going into New York airports.

We had a great deal of overflights in this area, patrols by all sorts of aircraft, helicopters, Coast Guard jets going by at four or five hundred feet during daylight hours, right after dark. And it went on for quite a while, for the better part of a year or more, I believe. It ended sometime this fall, I believe. So something is up.

I don't know what they thought they could detect from the air bringing a jet over at 100 feet and what they could see or detect. I would suspect that they were nuclear detection things trying to figure out if nukes were getting smuggled in.

I think that that is totally wrong. I think the nukes are here. The nukes are the nuclear power plants. And they're going to be used against us. We have zero air defense at Millstone or any other power plant. And I disagree.

By the way, I have been to the NRC's Web site this week. And I looked up. They do have a lot of good information. And it's clear that the Commission is paying attention to the concerns of citizens and our representatives. And we voiced our concerns to our representative in this district, our congressional representative. But nothing is being done.

And earlier one of the staff members said that he thought that in ten years, when the license renewal kicks in, that he would assume the government has got to do something about it. I happen to be a Federal employee, and I wouldn't share that assumption.

It's been three and a quarter years since the 9/11 attacks. And, if I'm not mistaken, I think the guards at Millstone here still don't have automatic weapons because of our dysfunctional State and Federal legislatures. They're not as well armed as the terrorists attacking our troops right now in Iraq.

Our guards should have heavy duty automatic weapons, just like the guards for the inauguration in Washington this month. If you have seen any of the pictures, they're very heavily armed. And they should also have things like RPGs and everything to stop vehicles.

(MPS-19-4) My concerns with the EIS are primarily section 5 and what I said earlier. It's complete ludicrousy to just ignore and quantify it as small and SAMA as a terrorist attack. I found one mention of the word "terrorist" in the entire document, and that was quoting me from a scoping hearing. I believe there's one mention of sabotage.

But there's something else I left out of the equation. In September, CAIR, the Council for American-Islamic Relations, opened up their first office in New England. And they opened it up right here in New London. They are a very litigious organization.

I'm not saying that they are a terrorist front, but many, many people, including U.S. senators on down -- I believe they are banned from the White House -- say they are basically a terrorist front and a terrorist fund-raising organization. Their executive director at their New London office is an engineer who works for Dominion.

I'm very concerned about the terrorist threat. There is zero air defense. We were lied to by our government. We were told that jets would be scrambled, not that that would do any good, that jets would be scrambled.

And Murray Renshaw, who was going to be here tonight -- he was here. I think he took off because of the snow. He has a very vivid debunking of that myth with a videotape he took on Labor Day. They made a number of circles around the plant. And they got down to an elevation of around 50 feet above the stack. They kept spiraling down doing lazy circles. And he showed that to thousands of people on his TV show. So it's not a secret. It wouldn't do any good to scramble jets anyhow.

So basically my concerns are attacks from the land, the air, and the water. And, by the way, when I brought up this issue with Congressman Simmons on Murray Renshaw's show, he said -- and the more I think about it, the more I think he is right -- that he was more concerned about a water-based attack.

And although we have plenty of intelligence, which -- I just enumerated that they are planning to attack nuclear power plants specifically on the East Coast using airplanes. So what are they going to do?

I'm very heartened. I think it's a good sign that the dry cask storage thing is getting underway and got approval. And that will do a great deal of good to remove that threat.

My only concern there is I would suggest -- I think, if I recall, I read in the paper that the concrete covers on the casks were going to be about four-feet thick.

I'm not an engineer, but I would think that that might not withstand a jet slamming into it. I would just urge that it be buried deeply in the gravel.

From the air, I think we need to defend from the air the same way that we design nuclear power plants today, that it be a walk-away thing, that if something goes wrong, it doesn't require human intervention and that you can just walk away from the problem. And it doesn't allow decision-making to enter in; in other words, whether to shoot down something.

I think we should declare a no-fly zone over Millstone and every other nuclear power plant. I don't think it's a big deal like they're trying to make out. We have a no-fly zone over every airport in the country. I think there should be automatic anti-aircraft guns in there, that if you stray into that zone, you're toast.

I think there also can be low-tech solutions. This is not the first time we have used this in this area. In the Seventeenth Century, Groton was ground zero, in America in the Seventeenth Century, when the worst slaughter of Native Americans occurred in New England.

In the Eighteenth Century, Groton was at ground zero once again when the British killed the defenders of Fort Griswald and as a percentage of our population, two and a half times as many people died on that day as died on 9/11.

What they did do to make sure in the War of 1812 that it wasn't repeated, they came up with a simple but eloquent low-tech solution. They forged a giant chain, which stretched across the mouth of the harbor. And if the British were sighted, they just pulled up the chain.

I think we should do something similar with Millstone. Planes are very fragile instruments. The wings will get ripped off easily if they encounter cables or anything. We run cables into Millstone now. I think we should just make a net. It sounds silly, but if you think about it, I don't think so.

And, finally, on water-based offenses, I'm concerned probably more than anything about them disrupting the flow of water in or blocking the flow of water out of the intakes and the exits. By flying planes in, al Qaeda had scuba-trained individuals. We know this from the intelligence. They had been training for that.

So I think some sort of baffles. I think some sort of nets or whatever to keep planes and divers and specifically some sort of detection system for all of that.

The stuff I have read on the Web site is encouraging. Clearly there is a lot. It's clearly classified, but clearly a lot is being done in terms of detection and preparation of the guards to handle an attack from the ground. But little or nothing is done from the air. And from what I can gather, not too much is being done from the water.

I don't see how this application can be improved by ignoring these environmental realities. There is a very real threat of making a big, huge mess out of this whole region or the region around any nuclear power plant. And I just don't buy the logic that the NRC is using.

Thank you.

FACILITATOR CAMERON: Thank you. Thank you for that analysis, Mr. Schwartz.

We are going to go to Gail. Gail?

MS. MERRILL: Thank you very much. I would have been a little more prepared, but I didn't know which order we were going in tonight. Sorry.

I am here tonight -- some of the people from the NRC and Dominion or whatever have heard me speak earlier today, but for those of you in the public and for the new reporters, the green party that is here recording, I'd like to tell you why I came two hours one way to be here.

My mother, living in Long Island, New York, about 12 miles away down wind from Millstone Nuclear Reactor has died of breast cancer. And I got it 11 months later, 20 years earlier than she did, because I grew up with the nuclear and chemical industries. She didn't. My grandmother never had it. My tumor is not genetic.

So I came here because there is nothing more important to me than my safety. And for all the time spent on reports, I guarantee you I spent more time in chemo. Okay?

The gentleman who made the comments about working for Electric Boat and worrying about the finances of Millstone, personally that comment is incredibly offensive to me. I don't give a damn about Waterford finances. I don't think Millstone has a right to threaten my life. And that's what I am faced with.

When you get your cancer if you live here long enough -- I'm saying "when," not "if" -- I think you might reconsider. You can't take the money with you when you die.

And I faced that a long time ago. My family is Merrill Lynch. It doesn't matter how much money I have. What matters is that I am alive. It humbles you very quickly. There is nothing more important to me. I don't give a damn about travel, parties. Who cares? It's a moot point if you're dead. So it's a very big deal to me. Okay? So you understand where I'm coming from.

I, too, have been working with Radiation and Public Health Project. Dr. Sternglass, who had his conversation with Einstein when he was only in his 20s, helped to stop the above-ground nuclear bomb testings that blew across the country.

(MPS-22-1) It was documented in St. Louis baby teeth. They documented with 35 baby teeth so far that the highest level of strontium-90, the radioactive plants are causing nuclear emission in our baby teeth. The highest is around towns living closest to Millstone Nuclear Reactor and Indian Point Nuclear Reactor. They've documented it.

(MPS-22-2) The highest cancer rate according to the Tumor Registry of Connecticut, which is our official Tumor Registry, the oldest and best in the country apparently, the highest rates are in New London County. And also then following that, the highest towns are right around Millstone Nuclear Reactor.

So I dispute the NRC's findings that there is no cancer link. I think it is so blatant. And I think anyone who denies it -- okay? -- it means who is following the money trail, folks.

So now you know my family history. The other thing that I came here to say is that I have watched far too many women -- and now it's actually 14-year-old and 15-year-old girls, more than one at each age, with breast cancer in the State now. That comes from our Tumor Registry. Check it out for yourself.

I have watched five women that I know of that I was told of die of breast cancer in my area in Fairfield County. Okay? Too many women in their 40s in too many different town. I know of too many women in their 30s getting double mastectomies and getting the cancer right back again. Now, you guys don't understand it. You don't got boobs. But we got boobs, and women talk. And if they don't have it, they're terrified of getting it because they're seeing what is happening to their friends.

Where I live, we don't have any toxic sites, no superfund sites. We're 25 miles down wind from any points. (MPS-22-3) I'm hit by both nuclear reactors. I'm within that 100-mile radius. That radiation.org documented statistically proves the risk for breast cancer mortality is greatest if you're within the 100 miles.

This woman at a nail salon says, "Who's next?" She knew 4 women in their 40s with different kinds of cancers. So that's my problem. It's not just my personal history. It's not just my mother's death. It's the women around me. And it's younger and younger and younger.

And you women probably are going to hear about it, especially if you bother to ask. Okay? You guys have to start asking too, because you're going to have a woman in your life who is going to be affected by this. And I hope to God there is an ounce of integrity and you're not just here doing your jobs in your suits because we are dying. And it's incredibly scary if you are on the receiving end, like I am.

These maps that I have here, I'm going to show this to everyone to see, God included. (MPS-22-4) This is the government maps, no dispute, folks. The government that employs the NRC has funded and done these maps. Okay? This is the breast cancer mortality link to nuclear reactors.

If you look at it visually and follow the pattern, we know that if it was just the hormones and the meat, the disruption to the hormones and the hormone replacement therapy feeding hormone-driven breast cancer tumors, the whole country would be in red for breast cancer mortality. But it's not.

(MPS-22-5) The areas of high breast cancer mortality line up with the location of nuclear reactors. And that is why the Northeast has the highest breast cancer mortality.

Then take a look at California. Take a look at Texas. Only one small dot in Texas that is in red, right where the nuclear reactors are.

So you can see this visually. You can see it documented with the tooth fairy project done by radiation.org. You can talk to your friends. You can look at your cemetery. In Westport, the new side of the cemetery had lots more young deaths, 40 and 50-year-olds, as opposed to long-term life happening. Okay?

That's what my friends and relatives and nurses and doctors and hospice workers are saying in my area. It's an epidemic, folks, and it's deadly.

And we're not just talking breast cancer. We have trials with leukemia, lung cancer. The daughter of strontium-90 is Yttrium if I have it pronounced right. Maybe my pronunciation is a little bit off. But I just learned this last night from Dr. Sternglass.

So it goes into your bones and teeth, the strontium-90 does. It acts like calcium, lowers your immune system, your thyroid functions. You are vulnerable to cancer, bacteria, and viruses. And then the daughter comes along and goes to the soft tissues, like lung cancer. So if you know people with lung cancer who never smoked, you might want to investigate that.

Dr. Sternglass, by the way, has been pursuing the low-level radiation health risks related to nuclear reactors for some 40 years. And he has testified as an expert. Go investigate it. It's quite stunning.

So my pet peeve, too many of us have cancers in too many different towns. I'm down wind. I may not be as close as you all. Thank God. But I'm down wind.

You need to close Millstone Nuclear Reactor. Too many of us don't want to die. I don't think anybody in this room would volunteer for that job. We have a right to be safe. We want to stay alive.

Anyone here with integrity? Okay? That's what it comes down to.

FACILITATOR CAMERON: Okay. Thank you very much.

MS. MERRILL: Thank you. (Applause.)

FACILITATOR CAMERON: Cynthia, did you want to say a few minutes' worth? I didn't know whether you wanted to comment again. But I'm going to hold you to the five-minute guideline.

MS. BESADE: Good evening, everyone. My name is Cynthia Besade. (MPS-16-2) This is my father, Joseph H. Besade. He worked vehemently to close Millstone, to stop the poison from emitting from the stack into our bodies, causing cancers of all sorts of variations, killing children at such a high rate it's hard to keep track of.

He lost seven of his coworkers. He worked for 20 years as a nuclear pipe-fitter at Millstone. And seven of his coworkers died of this very same disease that he passed from a little over a year ago.

Earlier today at the earlier session, I read from my list. I have a compilation of approximately 67-plus people. I'm going to put my father down for just a moment. This evening, as I went home and took messages from my answering machine, I learned that another relative has just been diagnosed with terminal lung cancer. Her husband passed, my uncle and aunt, my godparents.

My uncle passed from lung cancer -- actually, it was also esophageal cancer -- six weeks before my father. He lost his friends, his seven coworkers. He became the eighth. He knew too many people who worked at Millstone lived nearby that passed away.

(MPS-16-3) Our friends, our family, my classmates, my friends, their parents, their children, so many families have been destroyed by this terrible disease that has taken hold of our community, disease that we can only associate with ionizing radiation.

Yes, of course, cancer comes from other things. And we do live in a highly industrial society. However, you can only take a small sample from different contributors. You can only write off so many cases.

(MPS-16-4) There is now information, recent information, that gives us the ability to say that there is a correlation between these cancers, these access cancers, especially the ones in children, that says that there is a causal relationship.

Yes, I spoke earlier about wanting to know, how did you analyze the same information and come up with your findings when many people have taken a look; in particular, Joe Mangano, Dr. Sternglass, for many, many, many years.

The very first report I read from Dr. Sternglass was a study that he conducted in this area, in the New London County area, from 1978, 1978, when I first discovered that there was a problem, when I was sitting with my friends holding their hands as they are dying and they are in comas and they're passing away. And I am saying to myself, "Why is this?"

Why are the children that I baby-sit for? Why did they contract cancer? They live just down the street from me. They live two or three houses away from each other. And we buried them as well. And their families are still crushed, and they don't have any answer. But they all surmise it has to be something in the neighborhood. We're talking about less than two miles down wind.

My parents bought a home in 1963 to raise their family in one of the most pristine areas as he wanted us to have the same sort of ability to enjoy the natural resources in the Niantic River or the wonderful things that this area presents that are now gone.

When you talk about the winter flounder, we brought home bushel baskets of winter flounder, so much that we couldn't possibly consume it. We froze it, of course. We gave it to our relatives. We gave it to the neighbors. And we even had so much we sold it back to the fish store. For what? For more money to go fishing, to enjoy the pleasures that were there.

(MPS-16-5) Now, we ingested that shellfish and we ate that fish. And we ate the stuff that came from our garden. And now we know. And we drank the water from our well. And now we know that that radiation found its way into the soil and into the air that we breathe and most certainly into the water as well.

And that is irrefutable. The data is there. We have to stop this killing machine. We cannot commit the next generations, those yet unborn, to the ravages that we have experienced. This is horrible. The grief that these people and these families experienced, it doesn't go away. It's with you for a lifetime.

I drove back here in shock to realize that another one of my family members, another person in my life that I now need to add to the list that I submitted earlier -- my list continues to grow.

What am I supposed to think? This is not something that has been imagined. This is not something that people just conjure up. Why in the world would I want to even be standing here talking about this terrible thing that has just occurred again in my family when my heart aches for this man, somebody who dedicated over eight years of his life to make it right, to get this thing out in the public, to get you folks informed, and to ask you please to participate.

Stop the killing machine. Close Millstone today. Thank you very much.

FACILITATOR CAMERON: Thank you, Cynthia.

Nancy, do you want to take a few minutes?

MS. BURTON: Good evening. I am Nancy Burton. And I'm here speaking on behalf of the Connecticut Coalition against Millstone in opposition to this license renewal application and to speak about the draft environmental impact statement.

I spoke earlier. Some of you here heard what I had to say. I won't repeat it. But I have some information that I would like to add to what I presented before.

(MPS-23-1) What I neglected to say was that our review of this document shows it is very seriously flawed. If this is an environmental impact statement, it is difficult to understand why it omits to analyze the chief environmental impacts of this nuclear power plant on this community.

Some of those issues have been addressed here already this evening. (MPS-23-2) Terrorism is certainly one major omission. (MPS-23-3) And certainly the health issue is a second major omission.

At page 4-53 of this report, it states, astonishingly, "No evidence has been presented to report a causal relationship between increased cancer incidence and Millstone operations." That is simply not a true statement because the proceedings before tonight were replete with information and evidence linking Millstone with cancer. But after tonight, the NRC cannot make that statement again in good faith. That is going to be a lie.

(MPS-23-4) This evening, the NRC has received evidence that is irrefutable linking the emissions from Millstone, routine emissions, with pollution and contamination of the environment, which we see manifest in dozens and dozens and dozens and dozens of people in this community.

(MPS-23-5) We know from Millstone's reports that its strontium-90 has found its way less than two miles down wind to goats because it is revealed in their goat milk. Well, if the strontium-90

is found in goat milk, we know it must also be found in the grass, in the water, in the air, and in people. And can anybody not understand here how it ends up in the teeth of children in this community? You have the evidence. It's here tonight.

Now, with that evidence -- let's just not stop there. Let's understand what needs to be done because the killing time is over. We have had enough suffering.

Go to Seabreeze Drive. I didn't bring tonight but I will be very happy or not happy, not at all happy, but (MPS-23-6) I will dutifully present to the NRC a map of the different house locations on one street in Waterford. This is Waterford, Connecticut, supposedly doesn't have elevated cancer from Millstone. This is less than two miles down wind northeast from Millstone, at least seven incidences of cancer on that one street. Most of them now death.

And that only covers a very recent period of time. And, unfortunately, we have just learned of another case within the past couple of weeks.

We will present a map that has that information for you people to reveal. And you will in your final environmental impact statement concede that Millstone causes cancer in this community at unacceptable levels.

(MPS-23-7) And from there, you will determine to close Millstone. But before you do that, you will determine that there should be immediate action taken; for instance, filters. The strontium-90 that escapes through the vent at Millstone and contaminates this community can be blocked. Engineers know how to do that.

There is a cost factor involved, costs money. So what? Why should that plant spout radiation to this community when it is not necessary and it is killing people? Filters can be put there.

(MPS-23-8) Let me move into another area, which is a major oversight in this so-called environmental analysis. And that has to do with discharges, both to the air and the water of pollutants.

There is no documentation in this entire environmental impact statement of the chemicals, no identification of the hundreds of chemicals, many of them caustic, carcinogenic agents that are used at the plant routinely and flushed out into the Long Island Sound along with radioactive waste agents. It is unnecessary for this pollution to occur.

Why doesn't it say that in this environmental impact statement? It's so simple. It can be stopped. That is an alternative. The way to stop it other than shutting Millstone is to convert it to a closed cooling system.

Why isn't that mentioned as a present alternative to the way that the plant is operated now? If the plant were converted to a closed cooling system, that would: a) eliminate the discharge of the caustic chemicals to the Long Island Sound; b) eliminate the thermal plume to the Long Island Sound.

(MPS-23-9) Heat of the sound is one of the factors you people say is one of the causes for the loss of fish, but you don't think the thermal plume with the loss of fish. At the same time, such a closed cooling system would have the effect of virtually eliminating the killing of the indigenous fish species.

In 1993, Northeast Utilities analyzed the prospect of converting to a closed cooling system and found that it could be done and it could be economical. That was 1993.

Along came Dominion, the new report cited by your people in your analysis. It can't be done because it is too expensive and the benefit wouldn't equal the effort, the money term, no reference to the 1993, which said that it could be done and it could be done economically.

So we would encourage you to do what you said you did, but it sounds like you really didn't do this, which is to go into the community on a fact-finding discovery mission. Find that 1993 environmental report that Northeast Utilities filed. Go to the hospitals. Talk to doctors.

(MPS-23-10) When you analyzed the loss of fish, winter flounder, in your report, you state that you spoke with the DEP. You don't name anyone from DEP. You don't provide any documents from DEP. You just regurgitate what you say somebody said to you from there. That is not a very scientific methodology.

(MPS-23-11) At the same time, you didn't talk to fishermen. You said that you were concerned that over-fishing was responsible for depletion of the winter flounder. You didn't talk to fishermen. You didn't go back and talk to the expert, Mark Gibson from Long Island, who was able to persuade a judge of the Superior Court of this State to shut down Millstone Unit 2 to spare the winter flounder back in 1998. Why didn't you talk to him?

Instead, you talked to a consultant. You called his work "independent," but the consultant, Mr. Crivella, actually was a consultant paid and hired by the utility. You don't say that in your report.

Why didn't you talk to Victor Crecco at the Department of Environmental Protection? Why was your bias so manifest in your report?

FACILITATOR CAMERON: Nancy, I'm going to have to ask you to wrap up.

MS. BURTON: Because this is a defective document. I will. I certainly will.

(MPS-23-12) I have to point out one blatant misstatement of fact before I step away. And that appears at page 843, where the NRC is arguing against wind power, against solar power, against conversion to same methods and has this to say about replacement power. This is section 8.2.4. This is talking about alternatives, "If available, purchased power from other sources could obviate the need to renew the Millstone OLs, operating licenses. It is unlikely, however, that sufficient baseload from power supply would be available to replace the Millstone capacity. Connecticut is a net importer of power." That is simply not true.

You don't attribute that statement to any source, but we would recommend that you go to the Web site of the Connecticut Sighting Council. That is a State agency. Its responsibility under law is to create projections of electrical need and current generating capacity.

If you go to their Web site, you will see that there is not only no need to import power to Connecticut; power is exported. We have excess power. And even if we took out Unit 2 and Unit 3 from Millstone, we would continue to have excess power, even at times of peak demand.

So all of this is incorrect information, 8.2.4, very important, because if the NRC does what it is compelled to do in lights of the fact that have come out, and that is shut Millstone, this community will suffer a boon, a real estate boon, because people will be very pleased to live in an area where it was once unsafe because of an operating nuclear power plant. And there will be plenty of electricity. The lights will go on. And it's not even necessary to call upon the conservation. So I would encourage you to check your facts, correct the facts, do a proper environmental survey.

(MPS-23-13) The people who weren't here earlier don't know that Long Island wasn't notified of this meeting. The supervisor of the Town of Southhold, 22,000 people, his jurisdiction extends over Fisher's Island, which is within the 10-mile evacuation zone, they were not notified of this proceeding until the last minute.

They came. They protested. They pointed out -- and I would agree with them -- the defect of this proceeding by failure of notice. Under Federal law, National Environmental Protection Act requires meaningful public opportunities for public participation. And that is at the basis of it.

So I thank you very much for the time.

FACILITATOR CAMERON: Thank you. Thank you, Nancy. (Applause.)

MS. BURTON: I will be providing more written comments.

FACILITATOR CAMERON: Good, good.

MS. BURTON: Thank you.

FACILITATOR CAMERON: We will look forward to that.

Mr. John Markowicz?

MR. MARKOWICZ: Yes. For the record, I am John Markowicz. And I am co-chairman of the Nuclear Energy Advisory Council. I was introduced earlier this evening in responses to questions regarding the case study that had been requested by the Nuclear Energy Advisory Council in the late 1990s and was published in 2001.

As I indicated, the Nuclear Energy Advisory Council is a creature of statute. It has 15 volunteer members, no paid staff. We are supported by the Department of Environmental Protection and their Hazardous Radiation Health Division.

We used to hold monthly meetings during the restart process because of the concern within the community. And the reason basically why the organization was put together was to observe and to provide additional public input and oversight into the restart process.

With that having been successfully accomplished, the issues that are faced by the Energy Advisory Council have basically diminished. In fact, the public meetings that we held this past year with the passing of Joe Besade were pretty much not even attended by the public.

I would like to note that we did meet last year. And in one of the meetings -- and this is for the record. This is not a comment on the DEIS. I do regularly review the performance reports that are submitted as inspection reports by the regulators and by the headquarters staff. And I do read them, and I do review them.

The NRC has a color-code system they look at. And the way they report deficiencies when they find them is a green light and other colors. The operations of the plant over the past 24 months have been basically green, which is good, with the exception of Millstone 2, which had two reactor trips in March of last year. And there is a 12-month evaluation so they go white, which means they get additional inspections by the regulator. And they got them. And those inspection reports were published. And the utility received a passing grade.

And that white symbol on Millstone 2 will expire at the end of this current quarter if I remember the rules correctly, the end of March or the next reporting cycle, which would be the end of June.

(MPS-24-1) So what I am trying to put into the record on behalf of Nuclear Energy Advisory Council is the report to the public is that since the restart of the Millstone plants, Millstone's 2 and 3, they have been operated in a safe manner. In fact, based on that performance, there is no reason why I would recommend to the Nuclear Energy Advisory Council that the council vote to oppose the continued licensing of the plant.

I would note for the record and, as I did this afternoon in a different capacity, that, as you heard this evening, (MPS-24-2) there is palpable concern within this community regarding the security of the nuclear power installation, not so much the dome, more the spent fuel.

And through a number of different events that I participate, some with the Coast Guard, some with Homeland Security, some with other agencies, I am, in part, aware of activities that are going on to ensure the safety and the security of the plant. Somehow we have to do a better job of communicating that to the general public.

And since it is not covered in this report for reasons that were mentioned earlier and reasons that were mentioned earlier this afternoon, (MPS-24-3) (MPS-24-4) I respectfully submit that the abstract or some portion of the report address the absence of the security and the emergency preparedness elements of environmental issues from the report so the public is assured that something is going on and that it is just not being addressed in this report.

Thank you.

FACILITATOR CAMERON: Thank you, John, for that report and that suggestion.

I don't think I missed anybody. Did you want to say something?

MR. MARKOWICZ: Yes.

FACILITATOR CAMERON: Come on up.

MS. NATUSCH: I'm Lauren Natusch from New London, and I had three points that I wanted to make.

(MPS-25-1) I did want to support the objections that people have made or their concerns regarding security. I heard you say that you are not waiting for license renewal to assess this and implement safeguards, but I was not particularly reassured because what I really want to hear you say is that you are holding license renewal pending assessment of this threat and implementation of safeguards.

(MPS-25-2) My second point is I object to the risk assessment for winter flounder as moderate. If I understand you correctly, you were saying that because there are so many other risk factors for the flounder, you can't figure out exactly how important this particular risk is.

I want to say that the risks are cumulative. And when you have a flounder population that is already endangered, any additional risk factor becomes more than moderate. It becomes critical. It becomes larger than large. It could be the last straw.

And related to that, (MPS-25-3) I have heard a lot of testimony tonight about risk factors for the people living in this community. We seem to be having cancers. And it's very hard to pinpoint exactly what the causes of those cancers are.

The effect of all sorts of toxins in our environment is cumulative. And I want to suggest that, like the flounder, we are a vulnerable population and that any additional risk is unacceptable.

Thank you. (Applause.)

FACILITATOR CAMERON: Thank you, Lauren. And I think at some point the stenographer may just want to know how to spell your last name. Okay? All right. I think it's probably time for Andy to close out for us. I thank all of you for coming tonight, some of you for coming twice today. And thank you very much. Andy is going to close out the meeting for us.

VI. CLOSING/AVAILABILITY OF TRANSCRIPTS, ETC.

MR. KUGLER: I just want to thank you also for coming out this evening, particularly with the weather that we're having. One thing that I will ask is that you all be very careful going home. I'm not sure what the road conditions are like, but I know they were not supposed to be very good. So please be careful going home.

As mentioned, if you want to comment on the draft environmental impact statement after tonight, you can do so in writing or by e-mail through March 2nd.

In addition, if you have any additional questions this evening, the NRC staff, we're here. We'll stay around to answer any questions. We would be happy to talk to you after we are done.

That is all I have.

FACILITATOR CAMERON: Thank you.

(Whereupon, at 9:35 p.m., the foregoing matter was adjourned.)

A.6 Letters and E-Mails Received on the Draft SEIS