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BY EMAIL AND 1st CLASS MAIL
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Subject: NUREG-1437: Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 28, Regarding Oyster Creek Nuclear Generating Station Draft Report for Comment

Dear Chief Lesar:

Please accept these comments of Clean Ocean Action and the American Littoral Society on the above-referenced Draft General Environmental Impact Statement, Supplement 28 ("Draft GEIS") for Oyster Creek Nuclear Generating Station in Forked River, New Jersey ("OCNGS"). As confirmed by Harriet Nash of the Nuclear Regulatory Commission ("NRC"), public comments on the Draft GEIS are being accepted today because one of the NRC web pages listed today's date as the end of the public comment period.

Clean Ocean Action ("COA") is a broad-based coalition of conservation, environmental, fishing, boating, diving, student, surfing, women's, business, service, and community groups. COA's goal is to improve the degraded water quality of the marine waters off the New Jersey/New York coast. Clean Ocean Action identifies sources of pollution and mounts attacks on each source by using research, public education, and citizen action to convince our public officials to enact and enforce measures that will clean up and protect our ocean.[1]

The American Littoral Society ("ALS") is a national, non-profit organization whose mission is to promote the study and conservation of coastal areas and marine ecosystems. ALS's work involves a combination of law, policy, and educational activities that introduce citizens to their marine environment, the effects of human activities taking place in the water and on the land, and to approaches for its conservation.[2]

Barnegat Bay is an important natural resource that supports populations of commercially and recreationally significant fish, shellfish, and rare and endangered wildlife species, as well as

[1] Visit http://www.cleanoceanaction.org for more information.
[2] Visit http://www.littoralsociety.org for more information.

serving as a vital component of New Jersey's tourist industry.[3] The Bay is recognized by United States Environmental Protection Agency ("EPA") as one of 28 estuaries of "national significance." The fisheries (both fin and shellfish) of Barnegat Bay are an important economic resource: in 1991, freshwater and marine recreational fishing in New Jersey had a total economic impact of $1.33 billion, which supported 16,754 jobs and generated $630 million in retail sales to fishermen, $402 million in salaries and wages, $50 million in state tax revenues and $46 million in federal income tax revenues. Oyster Creek, which flows into Barnegat Bay, "represents a high-use recreational fishery," as stated by then-New Jersey Department of Environmental Protection Commissioner Bradley Campbell.[4]

It is widely acknowledged that Barnegat Bay is a severely stressed estuary. These stresses are reflected in declining natural resources. Under the National Environmental Policy Act (NEPA"), 42 U.S.C. 4321 et seq., the Nuclear Regulatory Commission ("NRC") is required to consider the environmental impact of the proposed re-licensing of the OCNGS for a period of twenty (20) years. Accordingly, the NRC must consider and disclose the ongoing damage to the marine environments of the Forked River, Oyster Creek, and Barnegat Bay caused by OCNGS. Additionally, the NRC must reevaluate the current conditions of operation of the OCNGS so that it might promote and advance the restoration and protection of this nationally significant estuary through the exercise of its authority; one of the purposes of NEPA (and by extension the NRC's obligations under it) is to "promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." 42 U.S.C. 4321.

Indeed, a "hard look" at the environmental impacts of the OCNGS is mandated and warranted, particularly given its history of environmental abuses and the many forms of pollutants that emanate from the plant. Specifically, the OCNGS:

--impinges millions of organisms each year;
--kills hundreds of millions organisms each year by entrainment;
--has killed or impinged a significant number of endangered sea turtles;
--has caused several significant fish kills due to thermal shock;
--discharges into Oyster Creek an assortment of pollutants, including radionuclides, chlorine, suspended solids, heat, and petroleum hydrocarbons.

It is worth noting that all of these impacts or releases could be eliminated or greatly reduced if OCNGS replaced its antiquated once-through cooling system with a closed cycle cooling system, but the Applicant has resisted this federally mandate.

While voluminous, the Draft GEIS fails to take a "hard look" at the environmental consequences of the proposed re-licensing and alternative courses of action. The NRC has a legal duty to gather and evaluate new information relevant to the impact of its actions. Where essential information regarding adverse impacts to the human environment is incomplete or missing, the NRC must obtain the information or evaluate the existing data upon theoretical approaches or research methods. However, these objectives are not met by the Draft GEIS. The

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[3] See http://www.epa.gov/owow/estuaries/programs/barn.htm.
[4] NJDEP Press Release: Oyster Creek Generating Station Fined for Water Violations and Fish Kill: NJDEP Seeks Compensation for Natural Resource Damages (Dec. 12, 2002).

Applicant has failed to supply the NRC with such basic information as current annual impingement and entrainment mortalities. Moreover, the Applicant has failed to provide any recent data as to the populations of fish and other aquatic life in the Barnegat Bay system. Without this information, the NRC cannot reasonably determine the extent of the impact the OCGNS has had on this valuable estuary, let alone its anticipated impact over the next 20 years.

As detailed within, the Draft GEIS cites out-dated studies with glaring deficiencies for the purposes used therein. The Draft GEIS contains conclusions that are inaccurate, inappropriate, and unscientific. Some environmental impacts are either mentioned in passing without any meaningful discussion or analysis, while others are not mentioned at all. In addition, the Draft GEIS does not adequately review the implementation of a closed-cycle cooling system as an alternative to the present once-through system at OCNGS, which is mandated by federal law, strongly recommended by the State, and which can be designed to eliminate the concern of excessive salt deposition. Accordingly, COA and ALS believe the determination and conclusions contained in the Draft GEIS that the subject re-licensing will result in only a small impact, and that no viable alternative exists are not valid, insufficiently demonstrated and unsupported by necessary factual information, inappropriately narrowly drawn and based on methodologies discredited by the EPA. For the reasons stated herein, COA and ALS further believe these determinations to be arbitrary, capricious and unreasonable, and justify an action that will undoubtedly lead to increased environmental degradation of the Barnegat Bay system.

A. GENERAL COMMENTS REGARDING DOCUMENTATION AND ANALYSES USED BY THE NRC TO DETERMINE THE FINDINGS OF SMALL IMPACTS

The Draft GEIS concludes that the impacts of impingement, entrainment and heat shock of fish and shellfish as a result of operation of the existing once-through cooling systems are SMALL. We strongly disagree with this conclusion and the manner in which it was reached. The determinations on these Category 2 issues were made based on the staff's evaluation of three assessments: 1) The EA[5] (1986) 316(a) and (b) demonstration, 2) Summers *et al*. (1989)[6] Review ("the Versar Report") and 3) OCNGS NJPDES DRAFT permit and fact sheet ("Draft NJPDES Permit") from New Jersey Department of Environmental Protection ("NJDEP")[7]. It is important to note that these three documents cannot be considered different sources of information, as both documents 2 and 3 are reviews (not original research) that rely heavily on the flawed data presented in 1. The conclusions of SMALL are fundamentally flawed for several reasons, including serious scientific issues with the studies and documents used, lack of recent data, significant ecological changes in the Barnegat Bay Estuary since these data were collected and lack of analysis on cumulative impacts.

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[5] EA (1986) Entrainment and Impingement Studies at Oyster Creek Nuclear Generating Station 1984 - 1985. Technical Report, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.

[6] Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection.

[7] New Jersey Department of Environmental Protection /New Jersey Pollution Discharge Elimination System Draft DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station. 2005. Fact Sheet.

The only original data used by the NRC (EA[8] and JCPL[9]) to draw the conclusions that the OCNGS has a SMALL impact on fish and shellfish was found to be scientifically flawed and deficient by many different scientists and analysts, including the Versar Report[10]. The NRC[11] lists many of the deficiencies and problems of these studies, some of which are detailed in this Section A, but fails to address them or provide any explanation why these data are still being utilized. To the contrary, the NRC continues to cite the conclusions made in these studies. In addition, these limited data are over 20 years old (data from 1975-1978[12] and 1985[13]) and there have been significant ecological changes in the Barnegat Bay Estuary since that time.

Moreover, in a nationwide study, the EPA made it clear that these older data sets are inadequate and new studies are needed to assess impacts. In the Federal Register dated July 9, 2004, the EPA stated:

> "the methods for monitoring impingement and entrainment used in the 1970s and 1980s, when most section 316(b) evaluations were performed, were often inconsistent and incomplete, making quantification of impacts difficult in some cases. Recent advances in environmental assessment techniques provide new and in some cases better tools for monitoring impingement and entrainment and quantifying the current magnitude of the impacts.[14]"

Similarly, the United States Fish and Wildlife Service ("FWS") provided specific comments to the NRC regarding OCGNS which also noted that the data were inadequate to assess impact. Specifically, the USFWS stated that "[t]he applicant's assertion that the impacts of entrainment of fish and shellfish are "small" cannot be supported adequately with data that are most likely outdated."[15]

The comments provided below further support the assertions of both the EPA and FWS that the data being used to assess impacts of operations at OCNGS are clearly outdated and inappropriate. Accordingly, COA and ALS find that the conclusions set

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[8] EA (1986) Entrainment and Impingement Studies at Oyster Creek Nuclear Generating Station 1984 - 1985. Technical Report, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.
[9] JCPL (1978) Oyster Creek and Forked River Nuclear Generating Stations 316 (a) and (b) Demonstration, Volumes 1-5. Technical Reports, Jersey Central Power and Light Company, Morristown, New Jersey.
[10] Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection.
[11] Generic Environmental Impact Statement for License Renewal of Nuclear Plans, Supplement 28 Regarding Oyster Creek Nuclear Generating Station, Draft Report for Comments US Nuclear Regulatory Commission, NUREG-1437, Pages 4-10 through 4-25.
[12] JCPL (1978) Oyster Creek and Forked River Nuclear Generating Stations 316 (a) and (b) Demonstration, Volumes 1-5. Technical Reports, Jersey Central Power and Light Company, Morristown, New Jersey.
[13] EA (1986) Entrainment and Impingement Studies at Oyster Creek Nuclear Generating Station 1984 - 1985. Technical Report, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.
[14] Federal Register: July 9, 2004, Volume 69, Number 131: Rules and Regulations, National Pollutant Discharge Elimination System-Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities. EPA. Pages 41575-41624.
[15] Draft NUREG-1437, Supplement 28 at A-22.

forth in the Draft GEIS are unsupported by sound science as they are based on studies that are flawed, deficient, old, and inadequate.

A.1. Lack of Recent Data

As stated numerous times above, there are no data available on aquatic populations in the Bay for the past thirty (30) years and the limited, outdated data that are available is scientifically flawed.

In addition, original hydrodynamic models of the thermal plume produced in the mid-1980s were extensively flawed and the consequent models produced by the Versar Report were based on these original flawed data. Therefore, these models should not have been used in the Draft GEIS. In order to rationally and reasonably assess the extent and magnitude of the thermal discharge to Barnegat Bay, reliable and current data, together with newly available modeling technology, should have been employed.

We are aware of the current intake-sampling program being conducted at OCNGS. However, it is irrelevant to this GEIS assessment because it will only provide data on impingement and entrainment at the plant. Without a concurrent biological assessment of bay-wide populations and communities (including benthos, plankton and nekton), it is impossible to assess the impacts of plant-generated losses to the populations and communities within the Bay. Moreover, COA and ALS are concerned that the current sampling program will have many of the same flaws and limitations as previous studies (see above) because the work-plan was not peer-reviewed, and like the previous studies, the program is not being performed by independent consultants. We note that the California Energy Commission recently concluded that "determining impacts is fundamentally a science issue, and should be independent of the regulations it serves, and their interpretations, except as the regulation specifies the impacts to be determined." Based on this concept, " [r]ecent assessments (in California) have commonly relied on a technical working group composed of independent scientists plus representatives from relevant agencies, the consulting firms doing the study, the power plant owner/operator and, in some cases, environmental groups, to oversee study design, implementation, and data and impact analyses.[16]" We strongly recommend that this same judgment be applied to all OCNGS impact studies.

A.2 Scientific flaws and deficiencies in the available data

The Versar Report[17] attempted to analyze the impacts of OCNGS operations on aquatic organisms using two available data sets, the JCPL 316(a) and (b) demonstration[18] in 1975-1978,

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[16] Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants. California Energy Commission. Staff Report. CEC-700-2005-13. June 2005.

[17] EA (1986) Entrainment and Impingement Studies at Oyster Creek Nuclear Generating Station 1984 - 1985. Technical Report, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.

and the EA study[19] of 1985. The Versar Report found significant problems with these data, forcing them to throw out large portions of the data sets and make numerous assumptions about the remaining information. The modeling and conclusions conducted in the Versar Report are therefore based on a very small data set that was riddled with inconsistencies and inaccuracies. **The Draft GEIS affirms the inaccuracy of these data and reports, but nevertheless uses them to justify a finding of SMALL impacts, which is both environmentally irresponsible and scientifically unacceptable.**

Some of the serious problems with the data that are noted by the Versar Report and are clearly acknowledged in the Draft GEIS, include:

- Best Methods Available were NOT used to determine the following impacts[20] (most would have likely resulted in an underestimation of impacts):
    - Magnitude of Impingement losses
    - Annual Entrainment Losses
    - Avoidance Temperature/Thermal Plume Exclusion
    - Cold Shock/Heat Shock Mortality
    - Population/Community level Impacts of Plume on Fish and Invertebrates
    - Fish Kills associated with Heat/Cold Shock
    - Hydrodynamic Modeling;

- Population surveys of fish and invertebrates in the Barnegat Bay conducted in the 1970's and consequently used to determine the impact of losses due to OCNGS operations[21]:
    - Used inappropriate mesh sizes,
    - Did not calculate gear collection efficiencies,
    - Only surveyed during daytime,
    - Used inadequate sampling frequencies;

- Serious flaws in the methods used to determine entrainment losses, which would result in significant underestimation of losses[22], including:
    - The use of only one of the discharge ports (despite differences in circulation pump operation between ports),
    - Use of discharge samples without any adjustment for mechanical destruction,
    - Sampling only from the condenser system, not the dilution pump system. Intake structures for these two systems are located at opposite sides of the intake canal

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[18] JCPL (1978) Oyster Creek and Forked River Nuclear Generating Stations 316 (a) and (b) Demonstration, Volumes 1-5. Technical Reports, Jersey Central Power and Light Company, Morristown, New Jersey.
[19] EA (1986) Entrainment and Impingement Studies at Oyster Creek Nuclear Generating Station 1984 - 1985. Technical Report, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.
[20] Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection. Pages IV-19, 27, 66.
[21] Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection. Page IV-65.
[22] Id. Page IV-32.

and have different configurations, making differences in the number and types of organisms entrained likely;

- Entrainment losses were calculated assuming a sampling efficiency of 100%, when in fact they could have been as low as 13% due to extrusion and avoidance. Thus entrainment losses were most likely significantly underestimated[23];

- Mortality estimates for entrainment losses were not determined for all "Representative Important Species" identified by the NRC;

- The only two impingement mortality studies available, conducted between 1975-1978[24] and in 1985[25], used different methods for determining immediate mortality rates. "Major differences in impingement studies among sampling years include[26]:

    - the type of traveling screens,
    - the mode of screen wash operation,
    - the length of impingement sampling time,
    - the frequency of sampling,
    - the time of day at which samples were collected."
    - Adequate details on methodology were not provided
    - Identical test species were not used in all studies;

- Capture efficiency values "for annual impingement were also not corrected for intake screen collection efficiency" as they assumed 100% capture efficiency. When efficiency studies were finally performed in 1985, only one species was utilized and mean collection efficiencies were highly variable (90% in May and 53% in November). "Therefore, GPUN did not use best methods reasonably available for estimating screen efficiency[27]";

- Sampling gear deficiencies contributed to a significant underestimate of annual impingement mortality[28]";

- Thermal Plume avoidance area was substantially underestimated[29];

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[23] Id, Page IV-27.
[24] JCPL (1978) Oyster Creek and Forked River Nuclear Generating Stations 316 (a) and (b) Demonstration, Volumes 1-5. Technical Reports, Jersey Central Power and Light Company, Morristown, New Jersey.
[25] EA (1986) Entrainment and Impingement Studies at Oyster Creek Nuclear Generating Station 1984 - 1985. Technical Report, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.
[26] Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection. Page IV-15.
[27] Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection. Pages IV-19, 27, 66. Page IV-20.
[28] Id. Page IV-19.
[29] Id. Page IV-42.

- Hydrodynamic modeling "was a poor reflection of the dynamic conditions characterizing Barnegat Bay." And it "underestimated the size of the plume and its associated isotherms.[30]"

A.3 Improper use of a draft document

The Draft GEIS also references the Draft NJPDES Permit prepared by the NJDEP. This document is not final and is still under review. Therefore, it is inappropriate and improper for the NRC to use this document to draw conclusions.

During the public comment period for the draft permit, the NJDEP received numerous and substantive criticisms of the data and analysis, including comments submitted by COA, ALS and many other concerned organizations and individuals (see attached letter, which is incorporated herein and is to be made part of the record). One important finding set forth in the Draft NJPDES Permit, was the clear statement that NJDEP "is concerned about both impingement and entrainment losses, but is particularly concerned about the entrainment losses[31]" and therefore are requiring changes to OCNGS operations. As stated therein, NJDEP's preferred alternative is to "[r]educe intake capacity to a level commensurate with the use of a closed-cycle, recirculating cooling system.[32]" **Indeed, these and several other statements by NJDEP in the Draft NJPDES Permit, have resulted in a NJDEP finding of significant impacts of impingement, entrainment and heat shock of fish and shellfish as a result of operation of the existing once-through cooling systems. These important conclusions directly and irreconcilably contradict the finding of SMALL environmental impacts set forth in the Draft GEIS.**

A.4 Misrepresentation of Dr. Michael Kennish's statements

The Draft GEIS also cites statements by Dr. Kennish[33] (2001) to support the conclusion that the impacts of impingement and entrainment are both SMALL. Dr. Michael Kennish is a marine research scientist at Rutgers University and holds a Ph.D. from William and Mary University. He is considered an expert in life history, ecology and behavior of fishes in the Barnegat Bay estuary. Dr. Kennish strongly rejects the use of his scientific review article to support the NRC's conclusion. During his testimony at the GEIS public hearing[34] and again in his comments submitted on the GEIS (August 30, 2006), he clearly stated his conclusions and

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[30] Id, page IV-42.
[31] New Jersey Department of Environmental Protection /New Jersey Pollution Discharge Elimination System Draft DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station. 2005. Fact Sheet Page 12.
[32] Id.
[33] M.J. Kennish (2001) State of the Estuary and Watershed: An Overview. Journal of Coastal Research, SI 32: 243-273.
[34] Public Meetings on the Draft Supplemental Environmental Impact Statement regarding Oyster Creek Nuclear Generating Station, License Renewal Review, Doc #50-219. Afternoon Session, July 12, 2006

statements were taken out of context and are incorrect, including the following quotes made by Dr. Kennish in his August 30 comment letter:

- *"I want to stress that this cited work is a review article, and the words quoted in the GEIS are taken out of context, thereby misconstruing the information."*

- *"Therefore, I object to . . . the use of the three quotes from my published article in the context shown on pages 4-15, 4-21, and 4-51 of the GEIS."*

Accordingly, the reliance on the work of Dr. Kennish to support findings contained in the Draft GEIS of SMALL impacts is clearly misplaced.

A.5 Significant Ecological Changes in the Barnegat Bay Estuary

The Draft GEIS is incomplete because it does not evaluate several relatively new conditions in the Barnegat Bay system. All natural systems are dynamic, exhibiting constant change in biotic and abiotic factors over time, and the Barnegat Bay estuary is no exception. There have been substantial ecological changes within the Barnegat Bay estuary since the 1970's when the only bay-wide benthic and fisheries survey studies were conducted by OCNGS in the Barnegat Bay, including:

- The presence of substantial and persistent algal blooms of the species *Aureococcus anophagefferens*[35],

- An increase in macro-algal blooms[36],

- A significant decline in the extent of seagrass between the late 1970's and the mid-1990's, resulting in the reduction of essential fish habitat and the potential loss of commercially and recreationally important species[37],

- Hydrologic changes including substantial reduction in base-flow of freshwater in the Barnegat Bay since the mid-1980's[38],

- Increased eutrophication,[39]

- Benthic community shift from a community dominated by filter-feeders to a deposit-feeder dominated benthic community,[40]

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[35] Gastrich et al. (2004) Assessment of Brown Tide Blooms, caused by *Aureococcus anophagefferens*, and contributing factors in New Jersey Coastal Bays: 2000-2002. Harmful Algae, Vol. 3, pp. 305-320.
[36] Barnegat Bay National Estuaries Program, State of the Bay 2005 Technical Report. August 2005.
[37] Id.
[38] Id.
[39] M.J. Kennish (2001 Barnegat Bay-Little Egg Harbor, New Jersey, Estuary and Watershed Assessment. Journal of Coastal Research, SI 32: pp 280.
[40] Michael Kennish, personal communication, July 27, 2006.

- New alignment of the South Jetty of the Barnegat Bay Inlet in 1991,

- Significant dredging and deepening of the Barnegat Bay Inlet from 1991-1993,

- Development has almost doubled since 1972 to 30% of the Barnegat Bay watershed in 2001[41].

These changes are significant enough to impact fish and invertebrate populations in the Barnegat Bay and the impact of the substantial losses of aquatic organisms from the continued operation of OCNGS must be evaluated based on these present conditions. The Draft GEIS lists these changes, but does not evaluate the impacts of plant operations based on these new conditions in the Bay, as required.

Moreover, an adequate estimation of the plant's current impacts simply cannot be determined without concurrent monitoring of both OCNGS induced losses and bay-wide population surveys.

Therefore, the Draft GEIS is inappropriately narrow in considering the environmental context used to reach its determination of SMALL impacts.

A.6 Inappropriate and Outdated Conclusions Drawn from the Data

The Draft GEIS accepts several conclusions of the Versar Report that are no longer valid based on current knowledge and understanding of natural aquatic systems in the Barnegat Bay estuary. Some of these invalid conclusions are set forth below together with our corresponding comments (in italics).

- "There is no evidence to suggest that past, current, or future entrainment of eggs, larvae, or juvenile forms of these species would destabilize or noticeably alter any important attribute of the resource." (Page 4-15) ***There have been no Bay population surveys conducted over the past 30 years that would allow such a conclusion to be reached.*** *NRC readily acknowledges this dearth of information in Section 2.2.5.3, which states that there are no recent population abundance data for 12 of the 14 species listed. The information provided on the remaining two species (blue crab and hard clams) are based on fisheries data, which is not an accurate or appropriate assessment of entire Bay-wide populations*;

- "Continued operation of OCNGS at the estimated levels of losses to representative important species populations, without modification to intake structures and/or operating practices, does not threaten the protection and propagation of balanced, indigenous populations." (Page 4-21) ***As stated above, without recent population data from Barnegat Bay, the impact of the OCNGS on aquatic populations in the bay cannot be determine*d;**

[41] Barnegat Bay National Estuaries Program, State of the Bay 2005 Technical Report. August 2005.

- Population losses (for grass shrimp) will be rapidly compensated for by reproduction (Page 4-15). *Both the EPA[42] and the California Energy Commission[43] came to separate conclusions that compensation does not reduce impacts from entrainment and impingement on adult populations and in fact, a population's natural compensatory ability may be compromised by impingement and entrainment losses in conjunction with all the other stressors encountered within a population's natural range*;

- Blue crab and winter flounder losses caused by OCNGS represent "a small fraction of the Barnegat Bay population" of those species (Page 4-15). *Without current population data on the aquatic organisms in the Barnegat Bay, collected concurrently with impingement and entrainment studies at OCNGS, this conclusion is without support and is no longer valid. This assertion is supported by the testimony of Dr. Michael Kennish at the July 12, 2006 GEIS public hearing[44] (herein "GEIS public hearing"), as well as in his written comments submitted to NRC on the GEIS (August 30, 2006). In his written comments, Dr. Kennish states:*

  > "*The lack of bay surveys during the past three decades, therefore, undermines the fundamental conclusions of the GEIS with regard to minimal impacts of impingement and entrainment of the OCNGS on aquatic populations in the bay*";

- Losses of bay anchovy and opossum shrimp "have little effect on higher trophic levels" (Page 4-15). *Without current community dynamics data for Barnegat Bay, collected concurrently with impingement and entrainment studies at OCNGS, this conclusion is also without support and is no longer valid. Again, our assertion is supported by the testimony and comments of Dr. Michael Kennish. In his written comments, Dr. Kennish states:*

  > "*the GEIS assessment of cooling system impacts on the aquatic ecology of the bay cannot be accurate because population surveys in the bay have not been conducted concurrently with impingement and entrainment sampling at the OCNGS since 1977. Consequently, the conclusions of the GEIS regarding OCNGS impacts on aquatic communities in Barnegat Bay are invalid and irrelevant*".

In reviewing the veracity of these conclusions stated in the Draft GEIS, it is important to bear in mind that **the only available bay-wide benthic and fisheries survey studies of Barnegat Bay were conducted in the 1970s. As recognized in the Versar Report, these**

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[42] Federal Register: July 9, 2004, Volume 69, Number 131: Rules and Regulations, National Pollutant Discharge Elimination System-Final Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities. EPA. Pages 41575-41624.

[43] Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants. California Energy Commission. Staff Report. CEC-700-2005-13. June 2005.

[44] Public Meetings on the Draft Supplemental Environmental Impact Statement regarding Oyster Creek Nuclear Generating Station, License Renewal Review, Doc #50-219. Afternoon Session, July 12, 2006

studies are "of limited value for assessing power plant effects[45]." Some of the deficiencies in these studies are detailed in Section A.2 above.

B. INADEQUACIES IN SPECIFIC SECTIONS OF THE GEIS

B.1 Important Fish and Shellfish near OCNGS (Section 2.2.5.3)

The lack of available current data on important fish and shellfish in the Barnegat Bay, as noted throughout this section, further illustrates the deficiencies of the Draft GEIS and the validity of the conclusion stated therein that continued operations of OCNGS will only result in SMALL impacts on important aquatic resources of the Bay.

B.2 Discharge of Chlorine and Other Biocides (Section 4.1)

The Draft GEIS contains a finding that discharges of chlorine are not expected to be a problem during the twenty (20) year license renewal period. The basis of this conclusion is not readily apparent, but is clearly not a scientific one. The substantial, negative impacts of chlorine and its byproducts have been consistently documented in the scientific literature and therefore need to be addressed in this GEIS. Chlorine is injected through each of the circulating pumps daily to prevent and remove fouling organisms such as bacteria.[46] Maximum chlorination occurs in the summer months to account for more rapid growth of fouling organisms.[47] To their detriment, fish, fish eggs and larvae, invertebrates, and zooplankton are most abundant during this time of increased chlorination. Some of the impacts related to chlorine and the chlorination process at OCNGS are detailed below.

(1) Chlorine directly kills phytoplankton and zooplankton entrained in the cooling system and can impact organisms residing in Oyster Creek and surrounding waters.

(2) Chlorine begins to be lethal to marine organisms at 0.01 mg/L[48] but tolerance is significantly lowered by high temperatures and physiological condition of the organisms.[49]

(3) OCNGS has a permitted daily maximum discharge limit of 0.20 mg/L of chlorine produced oxidants (CPOs)[50] into the discharge canal, 20 times higher than the lethal

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[45] Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection. Pages IV-19, 27, 66. Page IV-51.

[46] Assessment of the Impacts of the Oyster Creek Nuclear Generating Station on Kemp's Ridley (*Lepidochelys kempii*), Loggerhead (*Caretta caretta*), and Atlantic Green (*Chelonia mydas*) Sea Turtles. (December 2004), NRC PDR ML# 050060037.

[47] M.J. Kennish (2001) State of the Estuary and Watershed: An Overview. Journal of Coastal Research, SI 32: 243-273.

[48] J.S. Mattice and H.E. Zittel (1976) Site-specific evaluation of power plant chlorination. Journal of Water Pollution Control Federation, 48: 2284-2292.

[49] L.W. Hall Jr., D.T. Burton and S.L Margrey (1981) Acclimation temperature: an important factor in power plant chlorination studies with larval white perch, *Morone americana*. Journal of Toxicological and Environmental Health. 7(6): 941-950.

chlorine limit of many estuarine organisms including striped bass, mummichogs, and bunker.[51,52] One chlorine related fish kill resulted in the death of 500 Atlantic Menhaden in January of 1974.[53]

(4) Toxic residual organic compounds (chloramines), a byproduct of chlorination, persist in the discharge canal and effluent resulting in long-term exposure to fish and other aquatic organisms residing in the canal and plume area of Oyster Creek and Barnegat Bay.[54]

In addition to chlorine discharges, the current NJPDES permit for OCNGS provides that a maximum daily limit of 15 ppm of petroleum hydrocarbons that can be discharged from five (of seven) of their outfall pipes.[55] The sources of this contaminant are not clear, however, petroleum hydrocarbons are harmful to marine life. These impacts should have been more thoroughly evaluated in the Draft GEIS.

Small concentrations of sediments and other solids are sucked through and discharged from OCNGS. Depending on the amount, total suspended solids (TSS) and total dissolved solids (TDS) can have negative impacts due to increased turbidity and solids concentrations in surrounding waters. After forty (possibly sixty, should the license be renewed) years of operation, TSS and TDS can have significant adverse affects on the marine environment, especially if the sediment is contaminated with radionuclides. These impacts should have been more thoroughly evaluated in the Draft GEIS.

The above individual impacts must also be examined from an ecosystem perspective, including cumulative effects, to fully appreciate the overall effect of OCNGS on the surrounding habitat. For example, survivability of fish populations and their effects on fish stocks and the effects on the ecosystem.

Because of the above demonstrable, significant, adverse impacts to the waters of New Jersey and their resources, and the fact that no studies have been conducted to determine the impacts of these ongoing releases to aquatic organisms, **the NRC lacks evidence to conclude that these discharges will have "no impact" during the renewal period and beyond.**

B.3 Entrainment of Fish and Shellfish in Early Life Stages (Section 4.1.1) and Impingement of Fish and Shellfish (Section 4.1.2)

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[50] Effluent limitations and monitoring requirements of the 1994 (most recent) NJPDES/DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station, Part III-B/C.

[51] J.S. Mattice and H.E. Zittel (1976) Site-specific evaluation of power plant chlorination. Journal of Water Pollution Control Federation, 48: 2284-2292.

[52] W.P. Davis and D.P. Middaugh (1977) A revised review of the impact of chlorination processes upon marine ecosystems: update 1977. In: R.L Jolley (eds) *Water Chlorination: Environmental Impact and Health Effects-Volume 1*, Ann Arbor Science, Ann Arbor, Michigan, pgs. 283-310.

[53] M.J. Kennish (2001) State of the Estuary and Watershed: An Overview. Journal of Coastal Research, SI 32: 243-273.

[54] Ambient Water Quality Criteria for Chlorine (January 1985), USEPA 440/5-84-030, 57 pgs.

[55] Effluent limitations and monitoring requirements of the 1994 (most recent) NJPDES/DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station, Part III-B/C.

The NRC's conclusions that impacts of both entrainment and impingement are SMALL is fundamentally flawed for several reasons, including serious scientific issues with the studies and documents used, lack of recent data, significant ecological changes in the Barnegat Bay estuary since these data were collected and lack of analysis on cumulative impacts. These issues were fully evaluated in Section A of this comment letter.

We further note that the Draft GEIS does not appear to evaluate in any depth the immense Biological Oxygen Demand (BOD) loadings into the Barnegat Bay system from OCNGS. The organic loading discharged back into the Bay from the remains of entrained aquatic life averaged 17,000 lbs of oxygen demand per day during the summer months.[56] This daily BOD loading is equivalent to that of sewage treatment plant having a daily capacity of 25 million gallons. As this material decomposes, oxygen is removed from the Bay waters, contributing to and creating hypoxic conditions. This is a significant environmental impact that should have been evaluated in the Draft GEIS.

B.4 Heat Shock (Section 4.1.3), Distribution of Aquatic Organisms (Section 4.1) and Losses from Predation, Parasitism, and Disease Among Organisms Exposed to Sublethal Stresses (Section 4.1)

As was stated above, the Draft NJPDES Permit[57] referred to in this section has not yet been finalized. The current, expired NJPDES permit allows for a temperature differential of 22ºF (33ºF under special circumstances) between the intake and discharge canal[58]. Water temperature in the discharge canal is permitted to reach 110ºF, which affects the behavior, physiology, and habitat utilization of aquatic organisms in Oyster Creek and Barnegat Bay.[59] In the Draft GEIS, outdated and scientifically flawed data are once again utilized to reach the conclusions of (1) SMALL impacts to aquatic organisms due to heat shock, (2) NO IMPACT of the thermal plume on distribution of aquatic organisms and (3) NO IMPACTS of losses from predation, parasitism, and disease among organisms exposed to sublethal stressors. There are significant data available on the impacts of OCNGS' thermal plume on local organisms, none of which are referenced in the Draft GEIS.

The elevated temperature in Oyster Creek and the surrounding waters of Barnegat Bay induces behavioral changes that have been documented in important managed species such as bluefish, fluke, winter flounder, and tautogs[60]. Some of these behavioral changes include:

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[56] C.O'Neil, D.Doyle, O. Donovan and E.Kearns. Biochemical Oxygen Demand (BOD) as a Measure of Entrainment Loss at a Nuclear Power Station. The Bulletin of the American Littoral Society. Volume 10, Number 3 (July 1977).

[57] New Jersey Department of Environmental Protection /New Jersey Pollution Discharge Elimination System Draft DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station, 2005.

[58] Effluent limitations and monitoring requirements of the 1994 (most recent) NJPDES/DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station, Part III-B/C.

[59] M.J. Kennish, (2001) State of the Estuary and Watershed: An Overview. Journal of Coastal Research. SI 32: 243-273.

[60] O. Donovan, D. Doyle, C. O'Neill and E. Kearns (1977) Thermal Plume Impact on Fish Distributions in Barnegat Bay. Bull. Amer. Lit. Soc. 10(3): 14

a) Avoidance of parts or all of Oyster Creek by certain species during summer and early fall.[61]

b) Attraction to parts or all of Oyster Creek during winter when they should have migrated out of the area due to cold temperatures. Failure to migrate can lead to large-scale mortality (due to thermal shock) when the plant experiences a planned or emergency shut down.

(1) Records from January 1972 through December 1982 reported 2,404,496 fish were killed due to thermal shock including Atlantic menhaden, bay anchovy, bluefish, striped bass, and weakfish.[62]

(2) An emergency shutdown on January 21, 2000 caused a 17ºF drop in the water temperature in the discharge canal in 15 minutes. The rapid drop in temperature to 32ºF resulted in the death of approximately 3500 fish including 2980 striped bass.[63]

(3) An emergency shutdown on November 11, 2001 caused a 7ºF drop in the water temperature in the discharge canal in 15 minutes. The rapid drop in temperature to 48ºF resulted in the death of approximately 1407 fish.[64]

(4) A scheduled shutdown on September 23, 2002 caused the water in the discharge canal to increase to 101ºF in less than an hour and resulted in the death of approximately 6,000 fish.[65] AmerGen reached a settlement of approximately $1 million dollars over this incident.[66]

c) Metabolic rate of organisms increases with increased temperatures resulting in decreased growth and survival,[67] especially during summer months when ambient water temperatures are at their peak.

d) High water temperature decreases oxygen solubility in water and increases Biological Oxygen Demand ("BOD") resulting in dangerously low dissolved oxygen concentrations in the water.

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[61] M.J. Kennish, (2001) State of the Estuary and Watershed: An Overview. Journal of Coastal Research. SI 32: 243-273.

[62] M.J. Kennish, M.B. Roche and T.R. Tatham (1984) Anthropogenic effects on aquatic organisms. In: M.J. Kennish and R.A. Lutz (eds), *Ecology of Barnegat Bay, New Jersey*. NY: Springer-Verlag, pp. 318-338.

[63] Oyster Creek Nuclear Generating Station Fish Kill Monitoring Report (January 2000) NRC ML#003684420

[64] Oyster Creek 2001 Annual Environmental Operating Report (February 2002) NRC ML#020660222

[65] A. Cradic, Oyster Creek Generating Station fined for water violations and fish kills: DEP seeks compensation for Natural Resources Damages New Jersey Department of Environmental Protection news release (December 12, 2002), *available for viewing at* http://www.state.nj.us/dep/newsrel/releases/02_0131.htm

[66] P.C. Harvey, New Jersey reaches $1 million dollar settlement with owner of Oyster Creek Nuclear Power Plant regarding fish kills caused by thermal discharge. New Jersey Office of the Attorney General news release (April 8, 2004), *available for viewing at* http://www.state.nj.us/dep/newsrel/2004/04_0408ag.htm

[67] T. L. Beitinger, W. A. Bennett, R. and W. McCauley, (2000) Temperature Tolerances of North American Freshwater Fishes Exposed to Dynamic Changes in Temperature. Environmental Biology of Fishes, 58(3):237 – 275.

e) Calefaction or thermal loading in the discharge canal and Oyster Creek directly interferes with physiological processes of biota, such as enzyme activity, feeding, reproduction, respiration, and photosynthesis. Less conspicuous, indirect effects, which are difficult to quantify, include greater vulnerability to disease, to changing gaseous solubilities, and to chemical toxicants associated with thermal enrichment. [68]

Both the NJDEP draft permit[69] and Versar Report[70] found that the extent and width of the thermal plume often violates New Jersey surface water quality standards. These violations should automatically disqualify any finding of SMALL impact, because these standards are essential for the protection and propagation of aquatic life in the Barnegat Bay estuary. We further note that in other sections of the Draft GEIS, violations of state or federal standards are considered as MODERATE impacts.

B.5 Threatened or Endangered Aquatic Species (Section 4.6.1)

OCNGS has significant impacts on aquatic species, including endangered and threatened species. Plant records indicate 34 impingements and 14 mortalities of endangered sea turtles since 1992.[71] These data include the following species-specific incidents:

- 23 impinged Kemp's Ridley Sea Turtles with nine (9) mortalities,
- Seven (7) impinged Loggerhead Sea Turtles with two (2) mortalities, and
- Four (4) impinged Green Sea Turtles with one (1) mortality.

We note that the Kemp's Ridley Sea Turtles are the most endangered and most rare sea turtle. The re-licensing of OCNGS will result in the continued killing and harassing of this species.

In 1993, NOAA required a formal consultation on the operation of the OCNGS due to seven (7) takes of threatened and endangered sea turtles over two summers (1992 and 1993). Since then, OCNGS has met or exceeded their Incidental Take Allowance ("ITA") for endangered sea turtles four (4) times. Most notably, OCNGS exceeded their annual incidental take in 2004 when eight (8) juvenile Kemp's Ridley Sea Turtles (of indeterminate sex) were impinged and three (3) were killed in the three-month period from July 4 to September 23.

Despite this poor performance, in 2005, the National Marine Fisheries Service ("NMFS") inexplicably increased OCNGS's annual take limit of Kemp's Ridleys to eight (8) (with no more

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[68] M.J. Kennish, (2001) State of the Estuary and Watershed: An Overview. Journal of Coastal Research. SI 32: 243-273.

[69] New Jersey Department of Environmental Protection /New Jersey Pollution Discharge Elimination System Draft DSW Permit #NJ0005550 for Oyster Creek Nuclear Generating Station. 2005. Fact Sheet

[70] Summers, J.K. et al (1989) Technical Review and Evaluation of Thermal Effects Studies and Cooling Water Intake Structure Demonstration of Impact for the Oyster Creek Nuclear Generating Station. Revised Final Report. Prepared by Versar Inc. for NJ Department of Environmental Protection. Page IV-

[71] Assessment of the Impacts of the Oyster Creek Nuclear Generating Station on Kemp's Ridley (*Lepidochelys kempii*), Loggerhead (*Caretta caretta*), and Atlantic Green (*Chelonia mydas*) Sea Turtles. (December 2004), NRC PDR ML# 050060037.

than four (4) mortalities).[72] While Section 4.8.1 of the Draft GEIS suggests that OCNGS's Incidental Take Allowance was raised by NOAA due to an increase in Kemp's Ridley population abundances, there is no evidence that this species has rebounded. Kemp's Ridley retains its current status as being the most endangered of all the sea turtles. Rather, it appears that NMFS raised the take limit to accommodate mortalities that occur at the plant, as NMFS acknowledged that the continued operation of the plan may adversely affect this endangered species.

In the latest (2005) Section 7 Consultation, NFMS concluded that "the continued operation of the OCNGS may adversely affect but is not likely to jeopardize the continued existence of endangered Kemp's Ridley, green, or threatened loggerhead sea turtles**" These findings contradict the conclusion (said to be based on the 2005 consultation) in the Draft GEIS that impacts on threatened or endangered sea turtles from continued operation of OCNGS would be SMALL. Based on the information provided by NMFS, it is more appropriate to conclude the operations of OCNGS will at least have a MODERATE impact based upon the NRC's definition of same. (See Draft GEIS at 1-3)**

B.6 Cumulative Radiological Impacts (Section 4.8.3)

The Draft GEIS fails to adequately examine the cumulative impacts of radionuclides released from OCNGS on aquatic organisms utilizing Barnegat Bay. Reactor-released radionuclides from OCNGS have accumulated in bottom sediments and the estuarine biota since December 1969 when the facility commenced operation.[73] These radionuclides (^{60}Co, ^{137}Cs, ^{54}Mn) bioaccumulate throughout the estuarine food web, and have been detected in water, bottom sediments, benthic marine algae, seagrass, hard clams, blue crabs, bunker, winter flounder, summer flounder, bluefish, and several other fish.[74] Organisms collected near Oyster Creek had the highest levels of radionuclides but detectable levels were found through out the bay.[75] Recent sediments collected near the discharge canal contained levels of ^{60}Co that were up to 63 times higher than sediments collected at other locations within the Barnegat Bay-Little Egg Harbor estuary.[76]

There have been several reported releases of radionuclides into the environment since operations began at OCNGS forty years ago. There are measurable concentrations of several radioactive elements in the aquatic environment at this time and considering the aging infrastructure, additional releases are likely should the plant continue to operate for another 20 years. Thus, there is considerable justification to examine cumulative impacts of past and continued exposure to radionuclides on aquatic organisms utilizing Barnegat Bay.

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[72] National Marine Fisheries Service's Biological Opinion on the impact's of Oyster Creek Nuclear Generating Station located near Forked River, New Jersey, on endangered and threatened species. National Marine Fisheries Service, Northeast Regional Office, Sept. 22, 2005

[73] M.J. Kennish (2001) Barnegat Bay-Little Egg Harbor, New Jersey, Estuary and Watershed Assessment. Journal of Coastal Research, SI 32: pp 280.

[74] Id.

[75] R.L. Blanchard and B. Kahn (1979) Abundance and distribution of radionuclides discharged from a BWR nuclear power station into a marine bay. Nuclear Safety 20: 190-205.

[76] F.C. Moser and R.F. Bopp (2001) Particle-associated contaminants in the Barnegat Bay-Little Egg Harbor Estuary. Journal of Coastal Research, SI 32:229-242.

B.7 Cumulative Impacts on Aquatic Organisms (Section 4.8.1)

Many different factors must be considered when attempting to analyze cumulative impacts, including natural fluctuations in populations, the different stressors that interact to impact the system, and community-level effects. None of these analyzes were conducted by NRC in order to reach a conclusion of SMALL cumulative impact of plant operations. Moreover, the data does not exist at this time to conduct such an analysis.

Analyzing cumulative impacts at the population level requires an understanding of the natural fluctuation of a population in relation to the combined effects of all the different losses associated with operations at OCNGS (from impingement, entrainment, thermal pollution, degraded water quality, etc.) over the lifetime of the plant. These total losses are incurred on the population every year with some consistency, yet natural aquatic populations are rarely stable, and according to Dr. Kennish, can fluctuate up to 300% annually[77]. In years when a population is substantially reduced due to factors unrelated to plant operations, the additional impact of mortality from OCNGS may be much more substantial. Multiple years of poor recruitment of a population, combined with the consistent take from OCNGS operations, can ultimately lead to population crashes. For example, his scenario needs to be further explored in light of the hard clam fisheries collapse that has been documented in Barnegat Bay, especially considering that this species is consistently entrained by the once-through cooling system of OCNGS.

Many of the stressors (see Section A.3 above) that currently impact the Barnegat Bay are listed in this section, but the NRC fails to analyze the role of OCNGS-induced impacts in light of these issues. Although operations at OCNGS may not necessarily be responsible for all the stressors listed, the ongoing mortality caused by the plant could have a much more substantial impact on populations and communities, considering the additional impacts from all of these stressors. Therefore, an important part of assessing cumulative impacts is the relative contribution of once-through cooling systems to overall population decline. Cumulative anthropogenic sources of mortality can exceed the sustainability of the population, so that even a SMALL reduction in abundance of a species from OCNGS operations, can be enough to reduce that species below a threshold, thus resulting in a disproportionately large reduction in the population[78].

Finally, cumulative impacts must also take into account the impact to the community structure of Barnegat Bay. OCNGS operations target specific species based on size and habitat utilization. As these species continue to endure consistent losses, their decline in abundance may alter predator/prey interactions. Predators may move into other areas where their preferred prey is more prevalent leading to a shift in community structure. Dr. Kennish has reported such a change in benthic community structure, with a shift from a filter-feeder dominated community to a deposit-feeder dominated community.[79] The statement that "there is no evidence to suggest that the operation of the OCNGS cooling-water system has significantly altered the marine and

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[77] Public Meetings on the Draft Supplemental Environmental Impact Statement regarding Oyster Creek Nuclear Generating Station, License Renewal Review, Doc #50-219. Afternoon Session, July 12, 2006

[78] Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants. California Energy Commission. Staff Report. CEC-700-2005-13. June 2005

[79] Michael Kennish, personal communication, July 27, 2006.

estuarine food web in Barnegat Bay or resulted in significant changes in phytoplankton or zooplankton species composition" is completely unsubstantiated considering no bay-wide fisheries or invertebrate surveys have been conducted in Barnegat Bay for over thirty (30) years.

The Draft GEIS states, "[i]t is likely that plant operations contribute to some of the environmental concerns found in Barnegat Bay; the precise contribution, however, cannot be quantified without long-term studies of the estuary." Despite this clear and acknowledged lack of understanding, the Draft GEIS still concludes that "the cumulative impact of continued operation of the OCNGS once-through cooling system on aquatic resources in Barnegat Bay estuary would be SMALL." This conclusion is (1) unsubstantiated, and (2) apparently based on the Versar Report and statements made by Dr. Michael Kennish, neither of which provide a proper basis for the reasons set forth in Sections A.2, A.4 and A.6 above.

C. COMMENTS RELATING TO THE EVALUATION OF THE CLOSED CYCLE COOLING ALTERNATIVE (Section 8.1.1.1)

The Draft GEIS reaches the untenable and unsupportable conclusion that the alternative of closed cycle cooling would have MODERATE environmental impacts—a greater degree of harm than found for the present operation of OCNGS. Closed-cycle cooling would drastically reduce the amount of water (and species) withdrawn from Forked River by OCNGS. A closed-cycled cooling system would reduce the amount of water withdrawn by the OCNGS by as much as 96%.[80] The mortality of species entrained by OCNGS would be reduced by approximately that same percentage. By way of example, where certain once-through cooling systems entrain 3.65 million organisms per year, replacing that system with a closed-cycle cooling system would reduce the number of organisms entrained to as low as 180,000 organisms.[81] This dramatic reduction does not even account for the number of organisms spared from thermal shock, impingement, and polluted discharge by the closed-cycle cooling system. One study has found that the conversion from a once-through cooling system to a closed-cycle cooling system reduced fish impingement by over 95%.[82]

Moreover, Section 316(b) of the federal Clean Water Act requires that the "location, design, construction, and capacity of cooling water intake ***structures*** reflect the ***best technology available for minimizing adverse environmental impact.***"[83] It is well established that closed-cycle cooling is the "best" technology, because, as the NJDEP has recognized, it is "the only cooling water intake structure technology available to [OCNGS] to reduce entrainment."[84] Closed-cycle cooling is certainly "available," since 73 power plants have implemented this technology by converting from once-through to closed-cycle systems.[85]

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[80] EPA, Phase II Rule Technical Development Document, at 4-1 (available at www.epa.gov/ waterscience/316b/devdoc/ ch4.pdf).
[81] Riverkeeper, Inc. v. U.S. Envtl. Protection Agency, 358 F.3d 174, 195 fn. 22 (2d Cir. 2004).
[82] Benda, Robert S., et al., Comparison of Fish Impingement at the Palisades Nuclear Power Plant for Once-Through and Closed Cycle Cooling, Indiana Academy of Science (Vol. 85, 1975).
[83] CWA § 316(b), 33 U.S.C. § 1326(b) (emphasis added).
[84] NJDEP Fact Sheet on Proposed Permit for OCNGS, p. 12.
[85] EPA, Phase II Rule Technical Development Document, Chapt. 4 (available at www.epa.gov/ waterscience/316b/devdoc/ ch4.pdf).

This portion of the Draft GEIS, however, appears to be primarily based on an analysis conducted by URS Corporation for AmerGen[86], the plant operator, to demonstrate that conversion of OCNGS to a closed-cycle cooling system is "unavailable" technology for the OCNGS. The opening paragraph of the AmerGen document states, "This report was written with the intended audience being the permit writer [NJDEP] and is not intended as a detailed design engineering report." The analysis was not peer-reviewed, does not include all the available alternatives for cooling tower options, and is an obvious attempt to allow OCNGS to maintain its current once-through cooling system. Some of the environmental and water quality issues with cooling towers raised in the AmerGen report, and subsequently restated in the Draft GEIS, have been substantially overestimated when compared with analyses conducted by other agencies and consulting firms, including plume formation, salt-drift, and discharge water quality.[87,88,89] The Draft GEIS fails to consider available technologies that would satisfactorily address and/or essentially eliminate all three (3) of these concerns. In addition, the NRC did not fully explore all of the available alternatives to once-through cooling, nor did they question the analyses performed by AmerGen on the five other closed-cycle cooling systems they investigated. There are significant problems with AmerGen's arguments/issues used to eliminate other available cooling tower options that would have less of an impact on the environment, such as dry cooling towers.

One of the most important and unsubstantiated conclusions put-forth by AmerGen and accepted by NRC, is the statement that the use of a hybrid wet-dry cooling tower (AmerGen's preferred cooling tower option) would result in a MODERATE impact to air quality from salt emissions. Such conclusions have been perpetuated by many different power plants attempting to circumvent the EPA Phase I and II requirements, and emphatically rejected by the EPA and other regulatory agencies. The issue of salt drift from power plants utilizing saltwater has been shown in theory and practice to be of small significance and if necessary, is easily mitigated[90]. In addition, according to the EPA, " [m]odern cooling towers utilize advanced fill materials that have been developed to minimize salt or mineral drift effects. The Agency estimates that the typical plant installing a cooling tower as a result of the requirements of this rule will equip the tower with modern splash fill materials.[91]" The Draft GEIS must evaluate such salt-mitigation technologies if it is to take a "hard look" at the available alternatives.

Another important alternative that was not evaluated in the Draft GEIS nor by AmerGen was the use of wastewater from the Central Water Pollution Control Facility (current provider of wastewater treatment for the plant) as the source water for the cooling towers. The substantial reduction in water usage of cooling towers makes the utilization of wastewater a viable alternative. The reuse of the discharge from this facility would not only eliminate issues related

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[86] URS Corp. (2006) Determination of Cooling Tower Availability for Oyster Creek Generating Station. Prepared by URS for AmerGen Energy Co.
[87] Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants. California Energy Commission. Staff Report. CEC-700-2005-13. June 2005.
[88] Evaluation of Cooling System Alternatives Proposed Morro Bay Power Plant, Produced by Tetra Tech for the San Luis Obispo Regional Water Quality Control Board, May 2002.
[89] EPA § 316(b) TDD Chapter 3 New Facility Energy Penalties, Air Emissions, and Cooling Tower Side-Effects
[90] EPA § 316(b) TDD Chapter 3 New Facility Energy Penalties, Air Emissions, and Cooling Tower Side-Effects
[91] Id

to using saltwater, but would also provide an additional environmental benefit of eliminating or reducing the ocean discharge from the wastewater facility. The use of wastewater in cooling towers is not uncommon, especially in the western part of the country where water is an expensive commodity. For instance, the California Energy Commission has determined that

> "(w)astewater rather than seawater may be treated appropriately and used for feed-water to a cooling tower. Treated wastewater is less corrosive than ocean water so cooling tower construction materials may be less costly than is the case with salt water.[92]"

Instead of considering this important alternative, the Draft GEIS solely relies upon the analysis conducted by AmerGen. In so doing, the Draft GEIS fails to take a "hard look" at alternatives to the existing OCNGS cooling-water system.

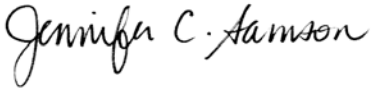
CONCLUSION

For all of the above reasons, COA and ALS submit that the Draft GEIS fails to take a "hard look" at many of the environmental impacts caused by OCNGS and its antiquated once-through cooling system. It is a matter of public record that OCGNS creates significant, adverse and detrimental impacts to the Barnegat Bay ecosystem, including the death of trillions of fish and aquatic organisms each year. Without current data to establish the sustainability of various local species despite this momentous threat, the Draft GEIS' classification of these impacts as SMALL is scientifically flawed and without basis. Moreover, the Draft GEIS fails to reasonably evaluate closed-cycle cooling as an alternative to the destructive once-through system. For these reasons, COA and ALS urge the NRC to deny the OCNGS' application for re-licensing.

Sincerely,

CLEAN OCEAN ACTION

By: 
Cindy Zipf, Executive Director

By: 
Jennifer Samson, Ph.D. / Principal Scientist

AMERICAN LITTORAL SOCIETY

By: /S/
Tim Dillingham, Executive Director

cc: Ruth Ehinger, NJDEP Coastal Management Office
Susan Rosenwinkel, NJDEP Bureau of Point Source Permitting

[92] Issues and Environmental Impacts Associated with Once-Through Cooling at California's Coastal Power Plants. California Energy Commission. Staff Report. CEC-700-2005-13. June 2005.