CLEAN OCEAN ACTION, THE AMERICAN LITTORAL SOCIETY,
SAVE BARNEGAT BAY, THE ASBURY PARK FISHING CLUB,
THE FISHERMAN'S DOCK CO-OP, INC. OF POINT PLEASANT, NJ,
THE NATURAL RESOURCES PROTECTIVE ASSOCIATION,
NY/NJ BAYKEEPER, THE RARITAN RIVERKEEPER,
THE SURFRIDER FOUNDATION AND WATERSPIRIT

March 23, 2007

By E-mail and Facsimile [(609) 292–8115]
N.J. Department of Environmental Protection
Division of Land Use Regulation
Bureau of Coastal Management
P.O. Box 439
Trenton, NJ 08625-0439
Attn: Mr. Andy Heyl

Re: Renewal Application of AmerGen for Federal Consistency Certification for Oyster Creek Nuclear Generation Station, Docket No. 1500-02-0005.5

Dear Mr. Heyl:

Having strong interests in the preservation and protection of the Barnegat Bay Estuary and its resources, Clean Ocean Action, the American Littoral Society, Save Barnegat Bay, the Asbury Park Fishing Club, the Fisherman's Dock Co-op, Inc. of Point Pleasant, NJ, the Natural Resources Protective Association, NY/NJ Baykeeper, the Raritan Riverkeeper, the Surfrider Foundation and WATERSPIRIT ("the Undersigned Parties") submit the following comments in strong opposition to the renewal application ("the Application") of AmerGen ("the Applicant") for Federal Consistency Certification for the Oyster Creek Generation Station ("OCGS") in Lacey Township, New Jersey, notice of which was published in the December 20, 2006 DEP Bulletin (Vol. 30, Issue 24). DEP extended the public comment period until March 25, 2007, and we appreciate DEP's courtesies in this regard.

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.

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' 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.

Save Barnegat Bay is a not-for-profit environmental group, founded in 1971, working to conserve undeveloped natural land and clean water throughout the Barnegat Bay watershed.

The Asbury Park Fishing Club, established in 1902, is the oldest Saltwater Fishing Club in the United States. The club has a strong, diverse membership and actively participates in the sport of fishing, and in service in the cause of the environment.

The Fisherman's Dock Co-op, Inc. of Point Pleasant, NJ, a commercial fishing cooperative that has been in business over 50 years, directly employs around 100 fishermen and staff, whose livelihoods depend on healthy fish stocks and a clean, safe environment for which those stocks to live.

The Natural Resources Protective Association, established in 1977, is a consortium of conservation groups, yacht clubs, sportsmen clubs, environmental groups and concerned citizens dedicated to the protection of the marine environment of Raritan Bay, and Lower New York Harbor.

NY/NJ Baykeeper is the citizen guardian of the Hudson-Raritan Estuary. Since 1990, NY/NJ Baykeeper has worked to protect, preserve, and restore the environment of the most urban estuary on Earth.

The Raritan Riverkeeper is a Baykeeper program whose mission it is to protect, preserve and restore the ecological integrity of the Raritan River, its tributaries, bay and watershed. It is the citizen advocate and voice for the river.

The Surfrider Foundation is a grassroots, non-profit, environmental organization that works to protect our oceans, waves, and beaches. Founded in 1984, Surfrider Foundation's most important coastal environmental work is carried out by its 60 chapters located along the East, West, Gulf, Puerto Rican, and Hawaiian coasts. There are five Surfrider Foundation chapters in New Jersey and New York.

WATERSPIRIT is a program sponsored by the Sisters of St. Joseph of Peace. WATERSPIRIT is a center committed to informing, inspiring and enabling people to recognize the connection between ecology and spirituality, appreciate the interdependence and sacredness of all creation, become more aware of the significance of water and watersheds in the wider context of the story of the Universe and the life of planet Earth, grow in knowledge of ecological issues related to oceans, rivers, lakes, coastlines and wetlands, embrace life style changes necessary to protect and preserve creation, and commit to joining efforts with others in confronting ecological issues.

A. OVERVIEW

The Undersigned Parties regard the consistency review process as an essential opportunity to analyze, evaluate and potentially arrest the ongoing damage to the marine environments of the Forked River, Oyster Creek, and Barnegat Bay caused by the Oyster Creek Nuclear Generating Station ("OCNGS"). Recognized by EPA as one of 28 estuaries of "national significance," Barnegat Bay "is not only a vital component of New Jersey's tourist industry, but is an important natural resource that supports populations of commercially and recreationally significant fish, shellfish, and

rare and endangered species."[1] Oyster Creek, which discharges into Barnegat Bay, "represents a high-use recreational fishery," as stated by former NJDEP Commissioner Bradley Campbell.[2]

The Barnegat Bay Estuary and the streams that flow into the estuary, including Oyster Creek and Forked River, are invaluable resources, albeit currently degraded. Construction of OCNGS began in 1964, with operation commencing in December 1969. At that time, neither the federal Coastal Zone Management Act ("CZMA")[3] nor New Jersey's Coastal Management Program had yet been adopted. Had they been adopted, it is unlikely that OCNGS would have been sited in such proximity to Barnegat Bay.

As part of its federal operating re-licensing procedure, OCNGS must demonstrate that its continued operation would be consistent with the enforceable policies with the State of New Jersey,[4] as set forth in the Coastal Zone Management Rules,[5] the Coastal Permit Program Rules and the Freshwater Wetlands Protection Act Rules. These rules generally prohibit or discourage any development, activity, or use that is inconsistent with the enforceable policies set forth therein.

The Undersigned Parties reject AmerGen's contention that continued operation of the OCNGS would be consistent with the State's enforceable policies. As detailed below, the Applicant does not support its many assertions regarding consistency with any current or applicable data, and ignores many of the serious environmental impacts OCNGS has on Barnegat Bay. Therefore, we respectfully submit that DEP must reject the subject application for the reasons set forth below.

B. THE SIGNIFICANCE AND IMPAIRMENT OF BARNEGAT BAY ESTUARY[6]

A brief overview of the significance and impairment of the Barnegat Bay Estuary is provided because DEP's determination regarding consistency should view the proposed use in a proper context. By focusing on its operations, the Applicant has not provided DEP with the proper context—a highly injurious use in an estuary of national significance that has, in recent decades, become stressed to the point of impairment.

B.1 The Estuary

The Barnegat Bay Estuary is distinct from all other places on earth. In fact, it is *irreplaceable.* The Barnegat Bay Estuary is a 75-square-mile environmentally sensitive estuarine system, consisting of aquatic vegetation, shellfish beds, finfish habitats, waterfowl nesting grounds, and spectacular vistas.

Barnegat Bay is a highly-productive estuarine resource, rich in native fish and wildlife populations and supporting both recreational and commercial water-dependent activities. The economy of many coastal areas in Ocean County relies on the natural beauty and bounty of the

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[1] See http://www.epa.gov/owow/estuaries/programs/barn.htm.
[2] NJDEP Press Release: Oyster Creek Generating Station Fined for Water Violations and Fish Kill: NJDEP Seeks Compensation for Natural Resource Damages (Dec. 12, 2002).
[3] 16 U.S.C. §§ 1451 et seq. (originally enacted in October 27, 1972).
[4] N.J.A.C. 7:7E-1.2(e).
[5] N.J.A.C. 7:7E-1 et seq.
[6] Accept as otherwise indicated, the information set forth in this Section B is adapted from materials developed by the Barnegat Bay Estuary Program.

Barnegat Bay Estuary. When its natural resources are imperiled, so are the livelihoods of the many people who live and work along the coast. Therefore, protecting these resources is critical to the future sustainability of the Barnegat Bay area.

Located in Ocean County, New Jersey, Barnegat Bay is a shallow, lagoon-type estuary, characteristic of the back-bay system of a barrier island coastline. The Barnegat Bay Estuarine system covers over 42 miles of shoreline from the Point Pleasant Canal to Little Egg Harbor Inlet, but is relatively shallow, with an average depth of 6 feet. The Barnegat Bay watershed drains from a land area of approximately 550 square miles.

B.2 The Barnegat Bay National Estuary Program (BBNEP)

At the request of the Governor of New Jersey, Barnegat Bay Estuary was recognized as an estuary of national significance threatened by pollution, development and overuse and was accepted into the National Estuary Program ("NEP") in July 1995. Established by Congress in 1987 to address the many complex issues that contribute to the deterioration of the Nation's major estuaries, NEP's goals include the protection and improvement of surface and groundwater quality, as well as the protection and enhancement of living resources. Estuaries are accepted into NEP on the basis of the following factors:

- The ecological significance of the estuary;
- The biological productivity of the estuary and its contribution to commercial and recreational fish and wildlife resources;
- The impact of commercial, residential, recreational, or industrial activities on the health of the estuary; and
- The degree to which comprehensive planning management may contribute to the ecological integrity of the estuary.

Having been identified as such, the significance of the Barnegat Bay Estuary cannot be overstated.

B.3 Growth and Other Stressors

An assessment of the estuary, conducted by the Barnegat Bay Estuary Program, indicates that human activities in the watershed and estuary have led to measurable degradation of water quality, destruction of natural habitats, and reduction of living resources in the system. The entire Barnegat Bay watershed has undergone dramatic growth since 1950, which has continued into the 1990s. During the 1990s, the municipalities surrounding the bay reported population expansions that on average exceeded 20 percent. The development accompanying the increasing population growth has resulted in land use changing from principally undeveloped and agricultural to suburban. Boat traffic, including personal watercraft, has also significantly grown on the bay, raising concerns with respect to both use conflicts and the cumulative impacts on the bay's water quality.

The magnitude and intensity of different land uses in the Barnegat Bay watershed are having significant and often degrading effects. Surface and groundwater quality in the watershed are being

degraded by nonpoint sources of pollution. The relationship between land use and water quality and quantity has been clearly established. Development also impacts the estuary's fisheries and other biological resources through nonpoint source pollution and habitat loss. It is the cumulative impacts of everyday activities in the Barnegat Bay watershed that are slowly degrading the environmental quality of this sensitive ecosystem.

This is not to suggest that OCGNS has not had a profound adverse impact on the Barnegat Bay Estuary. According to a 2001 study on the State of the [Barnegat Bay] Estuary,

> "[c]onstruction and operation of the OCNGS caused the loss and alteration of habitat in Forked River and Oyster Creek. Dredging and construction of the intake and discharge canals destroyed most of the original freshwater and low salinity habitats in the affected portions of the streams. The diversion and misuse of water at the Station changed the salinity, temperature, and dissolved oxygen levels in both streams such that they became similar to those of the bay."[7]

Unfortunately, this is not the extent of the injury to the Barnegat Bay Estuary. As detailed below, impingement, entrainment, and thermal discharge by OCNGS continues to degrade Barnegat Bay, in a manner this stressed system can no longer handle.

C. GENERAL COMMENTS REGARDING THE APPLICATION

C.1 Inappropriate Use of Draft Documents and Dated Studies

The Applicant refers to several DRAFT documents to support their finding of compliance, including the New Jersey Department of Environmental Protection's 2005 DRAFT NJPDES permit, the NRC's DRAFT Generic Environmental Impact Statement for OCNGS and the preliminary data from AmerGen's ongoing 316(b) Comprehensive Demonstration Study (CDS). The use of these documents is unacceptable, as these documents are still under review and subject to change, and in the case of the CDS, have not undergone any peer review. Moreover, DEP is still reviewing public and agency comments it received on the 2005 DRAFT NJPDES permit, which contain numerous and substantive criticisms of OCNGS's performance under the present permit and of some of the proposed permit parameters. Therefore, it is not appropriate for the Applicant to use these draft documents to suport a finding of consistency.

The Applicant further relies upon dated studies, some of which are over 35 years old.[8] As set forth in Section C.2 below, this reliance is misplaced because the Barnegat Bay system has, during the past several decades, become a far less healthy and stable ecosystem.

C.2 Significant Ecological Changes in the Barnegat Bay Estuary

The Applicant's analysis of compliance is incomplete because it erroneously assumes conditions in Barnegat Bay have remained unchanged since OCNGS began operations nearly 40 years ago, when in fact there are several relatively new conditions in the Barnegat Bay system. All

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

[8] AmerGen Federal Consistency Certification, Attachment A at 216-221.

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*[9],
- An increase in macro-algal blooms[10],
- 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[11],
- Hydrologic changes including substantial reduction in base-flow of freshwater in the Barnegat Bay since the mid-1980's[12],
- Increased eutrophication,[13]
- Benthic community shift from a community dominated by filter-feeders to a deposit-feeder dominated benthic community,[14]
- 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[15].

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 Applicant has failed to evaluate the impacts of OCNGS operations based on these new conditions in the Bay, as required to properly gauge the consistency of these operations with the State's enforceable policies.

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[9] 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.
[10] Barnegat Bay National Estuaries Program, State of the Bay 2005 Technical Report. August 2005.
[11] Id.
[12] Id.
[13] M.J. Kennish (2001 Barnegat Bay-Little Egg Harbor, New Jersey, Estuary and Watershed Assessment. Journal of Coastal Research, SI 32: pp 280.
[14] Michael Kennish, personal communication, July 27, 2006.
[15] Barnegat Bay National Estuaries Program, State of the Bay 2005 Technical Report. August 2005.

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

C.3 Cumulative Impacts of OCNGS Operations on Aquatic Organisms

The Applicant's analysis fails to evaluate or consider the cumulative impact of OCNGS operations on aquatic organisms. Many different factors (and up-to-date, empirical data) 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 the Applicant. Moreover, during the four decades, the Applicant has not collected adequate data to enable DEP or the public to independently 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 can fluctuate up to 300% annually[16]. 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 significant, adverse impacts on the natural functioning of the affected populations and Bay-wide ecology, including, without limitation, population crashes. For example, the hard clam population in Barnegat Bay is collapsing, and this species is consistently entrained by the once-through cooling system of OCNGS. The Applicant has not made a sufficient demonstration that there is no casual relationship between its operations and the decline of hard clams.

The Applicant fails to analyze the role of OCNGS-induced impacts in light of the many stressors (see Sections B.3 and C.2 above) that currently impact the Barnegat Bay. The ongoing mortality caused by the plant could have substantially greater, adverse impacts on populations and communities, when considered in the context of the impacts from all stressors. Therefore, the relative contribution of once-through cooling systems to overall population decline must be assessed. 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[17].

Finally, the Applicant has failed to take into account the cumulative impacts 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

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[16] 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

[17] 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

prey is more prevalent leading to a shift in community structure. Such a change in benthic community structure, with a shift from a filter-feeder dominated community to a deposit-feeder dominated community, has been reported,[18] and considering the billions of zooplankton entrained by the plant each year, a similar shift is likely in the pelagic community structure.

C.4 The Draft NJPDES Permit is in a State of Flux.

The consistency review process requires that the Applicant's development, activities and use be evaluated. However, this cannot be accurately gauged at this moment because the manner in which the Applicant will achieve Section 316(b) compliance has not been determined. Due to a recent ruling by the Second Circuit, it is not clear what will be required of the Applicant in that regard, nor what impacts that indeterminable requirement may have on the Barnegat Bay system.

The Draft NJPDES set forth two compliance alternatives for OCGNS with regard to Section 316(b): the installation of closed-cycle cooling, or an alternative featuring habitat restoration. However, the Second Circuit has recently invalidated habitat restoration as a "best technology available",[19] and therefore, DEP cannot incorporate this alternative into the Final NJDPES Permit. In turn, EPA has just suspended the Phase II Rule, and is substituting a Best Professional Judgment standard until further notice.[20] Therefore, it is not clear what type of cooling water intake structure will be required of the Applicant during its renewal term. Will the Applicant need to build cooling towers? Will the Applicant be allowed to use its once-through cooling system that has been proven deadly to marine organisms? What other alternatives might be available to the Applicant? Clearly, these questions can only be answered once a Final NJPDES Permit issues. In this essential respect, the Application is both incomplete and premature.

D. COMMENTS REGARD SPECIFIC SECTIONS OF THE APPLICATION

D.1 Coastal Decision Making Process (N.J.A.C. 7:7E-1.5)

As set forth in the Coastal Zone Management Rules, New Jersey's enforceable coastal policies create an obligation to consider, account for, and manage multiple uses, impacts and policy goals for a wide range of coastal resources and uses. Further, these policies vest the State of New Jersey's duty and responsibility to account for interactions between uses, conflicts among competing interests and "a broad range of concerns." The CZM Rules seek an "intentional balancing and conflict reducing approach...involv[ing] a broad range of concerns." New Jersey's enforceable CZM policies explicitly call for "weigh[ing], evaluat[ing] and interpret[ing] complex interests, using the framework established by the rules."(Emphasis added). This requires AmerGen to not only demonstrate compliance with the specific requirements of each enforceable policy, but requires DEP in evaluating the Federal Consistency Determination to undertake a more comprehensive, integrative evaluation in furtherance of the policy goals described above. In carrying out this admittedly complex analysis, the CZM Rules require DEP to be guided by eight (8) basic policies, the most fundamental of which is the first—to protect and enhance the coastal ecosystem.[21]

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[18] Michael Kennish, (2006) personal communication, July 27, 2006.
[19] Riverkeeper, Inc. v. EPA, No. 04-6692 (2d Cir. Jan. 25, 2007).
[20] EPA Memo dated March 20, 2007 (enclosed).
[21] N.J.A.C. 7:7E-1.5(1)(i).

D1.1. Protect and Enhance the Coastal Ecosystem (N.J.A.C. 7:7E-1.5(1)(i))

While acknowledging its obligation to demonstrate compliance with this enforceable policy,[22] the Applicant fails to substantively demonstrate compliance with this enforceable policy, either in part or in whole. The Application does not demonstrate how the proposed action will protect the coastal ecosystem, or how it will enhance the coastal ecosystem. Specifically, the Application fails to recognize and evaluate the impact of OCNGS operations on Barnegat Bay:

- In light of its status as an "Estuary of National Significance", and the policy and management goals articulated through the National Estuary Program and their relationship to the CZM policy at N.J.A.C. 7:7E-1.5(1)(i);

- In the context of its contribution to the overall cumulative impact of multiple stressors on the ecological health of Barnegat Bay, and fails to demonstrate compliance with N.J.A.C. 7:7E-1.5(1)(i) with regard to such impact;

- Utilizing current and up to date scientific and other information characterizing the condition of the estuary, its watershed, its ecological health and the interaction and cumulative impacts of multiple environmental stressors.

In addition to these specific failures to show consistency, the CZM Rules require DEP to evaluate the fundamental question of whether to allow an aging nuclear power plant, utilizing an outdated and destructive cooling system, for another twenty (20) years on the shores of an estuary of national significance.

While the Applicant repeatedly attempts to constrain the basis of DEP's consistency review to decisions made over 30 years ago (e.g., initial siting decisions, prior NRC determinations, etc.), its acknowledged need for the requested consistency determination clearly allows (and requires) DEP to evaluate OCNGS's operations (in the context of its location) in "real time." In fact, Basic Location Rule explicitly authorizes and requires DEP to reject a location that might otherwise be in compliance with N.J.A.C. 7:7E-3, 4, 5, 5A, 5B and 6, when necessary to protect wildlife and marine fisheries and to preserve, protect and enhance the natural environment.[23]

It stretches the imagination to envision an effective coastal management program that would allow the siting and continued operation of a nuclear power plant, particularly one utilizing a destructive once-through cooling system, within an estuary recognize at both the state and federal level as being of "national significance". The undeniable and significant impacts to the health and productivity of Barnegat Bay caused by authorizing OCNGS to operate for another twenty (20) years simply cannot be reconciled with the New Jersey Coastal Management Program's primary and overriding policy goal to "protect and enhance the coastal ecosystem."

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[22] AmerGen Federal Consistency Certification, Attachment A, at 4.
[23] N.J.A.C. 7:7E-6.2

D.2 Shellfish Habitat (N.J.A.C. 7:7E-3.2)

The CZM Rules identify Shellfish Habitat as one of several "Special Areas," that is, "areas that are so naturally valuable, important for human use, hazardous, sensitive to impact, or particular in their planning requirements, as to merit focused attention and special management rules."[24] In order to demonstrate consistency with the Shellfish Habitat rule, the Applicant must show that its continued operations would not "result in the destruction, condemnation . . . or contamination of shellfish habitat."[25] By letter dated June 1, 2006, DEP expressly requested that the Applicant "address any impacts of the facility, since its construction, on the adjacent shellfish beds in Barnegat Bay."[26] For reasons stated below, the Applicant has failed to provide sufficient information to demonstrate its operations are consistent with the Shellfish Habitat rule. In fact, hard clams appear to be in sharp or dramatic (as characterized by the Applicant) decline and there is evidence linking this decline to OCNGS.

For the last 20 years, OCNGS has not conducted any shellfish inventories of Barnegat Bay in the vicinity of the plant.[27] Therefore, there is no basis for the Applicant's conclusion that its operations are consistent with the Shellfish rule. The historic record indicates a robust shellfishery in the Bay as recent as the early 1970's[28], but the 1986 shellfish reports identified dramatic declines, with Barnegat Bay hard clam production at only 0.6% of the 1970's levels[29]. A 2001 hard clam inventory conducted in Little Egg Harbor (south of OCNGS) indicated a 67% decline from the 1986 survey.[30] There are indications that a similar decline has occurred in the northern portions of the Barnegat Bay, but the current status of the resource in the vicinity of OCNGS is unknown.

The Applicant speculates the bay-wide declines in hard clam production must mean that any declines in the vicinity of OCNGS are attributable to a more regional influence than the plant. Of course, the Applicant presents no data in support of its contention, in part because this self-described "good steward of the environment"[31] has failed to conduct a shellfish assessment for over 25 years. Nor does it disclose to DEP just how many clam larvae are entrained by OCNGS on an annual basis, or the effects of its thermal plume on clam growth and reproduction.

Over the last four (4) decades, OCNGS has conducted precisely one (1) study on the entrainment of clam larvae. The one-year study (1975-76) reported that **112.33 billion clam larvae**

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[24] N.J.A.C. 7:7E-3.1, 3.2.
[25] N.J.A.C. 7:7E-3.2(c).
[26] Letter of June 1, 2006 from DEP to T. Rausch.
[27] Amer Federal Consistency Certification, Attachment A at 19.
[28] Ford, S. E. (1997) History and present status of molluscan shellfisheries from Barnegat Bay to Delaware Bay. *In* C. L. MacKenzie, Jr., V. G. Burrell, Jr., A. Rosenfield, and W. L.Hobart, (eds.). The history, present condition , and future of the molluscan fisheries of North and Central America and Europe, Vol. 1, Atlantic and Gulf Coasts. U.S. Dep.Commer., NOAA Tech. Rep. 127, p. 119-140.
[29] MacKenzie, C.L., Jr. (2003) Comparison of invertebrate abundances in four bays of the northeastern United States: two bays with sparse quahogs and two bays with abundant quahogs. *Northeast Fish. Sci. Cent. Ref. Doc.* 03-10; 25 p.
[30] Celestino, M.P. (2003) Shellfish stock assessment of Little Egg Harbor Bay, NJ DEP.
[31] AmerGen Federal Consistency Certification, Attachment A at 4.

were entrained by the plant's once-through cooling system.[32] Clearly, if OCNGS continues to entrain hard clam larvae at anywhere near this historic rate, the plant's impact on Barnegat Bay as Shellfish Habitat could be substantial, particularly with bay-wide populations in "dramatic" decline. In fact, entrainment rates of clam larvae may be even higher. A DEP-funded scientific review of that 1975-76 study identified several serious flaws in the sampling methods employed, resulting in a determination that "*density estimates clearly were underestimates of actual entrainment density*"[33]

From the onset of its operations, researchers have been aware of the serious impacts of elevated temperatures on some of the planktonic larvae subjected to the once-through cooling system from OCNGS. Some observations recorded within two years of operations included[34]:

- Significant mortality of an ecologically important meroplankton form (dwarf clam, *Mulinia lateralis*) occurs at intake temperatures as low as 68° C and exposure times of only 15 min.

- The number of meroplankton passing through the condenser when intake temperatures exceeded 68° C is very high (average number of *Mulinia* larvae through the system in a 16 week period was 9 Billion larvae/week)

- A dramatic population decline of *Mulinia* in Barnegat Bay occurred immediately following start-up at OCNGS and had yet to recover by 1972.

- A decline in other benthic invertebrate species which depend on *Mulinia* as a food source, was also detected.

- As little as five minutes of exposure to temperatures above 82° C is lethal to most zooplankton present in the intake water.

There is further reason to believe the thermal plume might be contributing to hard clam declines. A 1975 study found that during warm summer months, the thermal effluent adversely impacted hard clams by reducing growth rates and precluding spawning.[35] Impacts that depress growth and reproduction can have long-term consequences on the viability of the population. Under the current NJPDES permit, water temperature in the discharge canal is permitted to reach 110° F.[36] Nevertheless, the Applicant does not discuss this potential impact on the shellfish habitat of Barnegat Bay.

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[32] 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.

[33] Id.

[34] Loveland, R.E., et al. (1972) The qualitative and quantitative analysis of the benthic flora and fauna of Barnegat Bay before and after the onset of thermal addition. Eighth Progress Report. August 18, 1972.

[35] Kennish, M.J. and Olsson, R.K. (1975) Effects of thermal discharges on the microstructural growth of *Mercenaria mercenaria*. Envir. Geol. 1:41-64.

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

In view of the above, the Applicant has failed to demonstrate consistency with the Shellfish Habitat rule. The continued operation of the OCNGS clearly threatens the "destruction, condemnation . . . or contamination of shellfish habitat" within Barnegat Bay. Accordingly, we urge DEP to make a finding against consistency.

D.3 Finfish Migratory Pathways (N.J.A.C. 7:7E-3.5)

Finfish Migratory Pathways are another Special Area protected by the CZM rules through prohibitions on certain types of developments and activities. These waterways serve as vital passageways for diadromous fish to and from spawning areas. DEP has identified seven (7) species of concern,[37] five (5) of which the Applicant admits can be found in Barnegat Bay, Forked River and Oyster Creek[38]. The Finfish Migratory Pathways rule protects these species by prohibiting activities that impede migration through physical barriers or though water quality impairment.[39] In addition, mitigation measures are required for any activity that would result in lowered dissolved oxygen levels, raised ambient water temperature, impingement of fish, or entrainment of fish eggs, larvae or juveniles.[40] Accordingly, it is imperative that the Applicant show how its operations are consistent with the State's policy on Finfish Migratory Pathways.

Before commenting on our scientific concerns, we note that the Applicant's response to this rule is wholly insufficient. The Applicant does not analyze its operations under this rule, stating that "no new construction or development . . . is planned."[41] This response is deficient because the CZM rules define the term "development" to include "any activity for which a. . . . Federal consistency determination is required . . . ."[42] This would include the operation of its once-through cooling-water system. Therefore, the Applicant has failed to provide DEP with appropriate responses to subsections (b), (c) and (d) of this rule.

As to our scientific concerns, the Applicant confirms that several species of concern listed in this section are found in Barnegat Bay and are impacted by elevated water temperatures, impingement, and entrainment due to operations of OCNGS's once-through cooling system. However, the Applicant has failed to provide adequate scientific support for its contentions that these impacts do not adversely impact water quality or seasonal migration, spawning and population levels of diadromous species. Moreover, the Applicant makes an unsupported assertion that striped bass and American shad do not spawn in Barnegat Bay, and thereby removes those fish from its analysis.

In fact, several species that utilize the Barnegat Bay continue to experience significant population declines, including blueback herring[43]. In the recently released Final GEIS for OCNGS, the NRC noted:

> *"Summers et al. (1989) concluded that continued operation of OCNGS would not "threaten the protection and propagation of balanced, indigenous populations." Because recent population level monitoring data from*

[37] N.J.A.C. 7:7E-3.5
[38] AmerGen Federal Consistency Certification, Attachment A at 23.
[39] N.J.A.C. 7:7E-3.5(b)-(c).
[40] N.J.A.C. 7:7E-3.5(c)(1).
[41] AmerGen Federal Consistency Certification, Attachment A at 23.
[42] N.J.A.C. 7:7E-1.8.
[43] Atlantic States Marine Fisheries Commission, Information on Managed Species

the estuary are not available, it is not possible for the NRC staff to determine whether the conclusions of Summers et al. (1989) are still valid, though comments received on the draft SEIS contend that the current condition of Barnegat Bay does not resemble the past."[44]

As detailed below, OCNGS has a significant impact on water quality and population levels of diadromous fish.

D.3.1 Elevated water temperatures and reduced dissolved oxygen levels

The once-through cooling system used by OCNGS results in an increase in water temperature (between 22-33°F) between the intake and discharge canals.[45] This drastic increase in temperature is likely to lower water quality to such an extent as to interfere with the movement of fish along migratory finfish pathways in the vicinity of the plant, and may further require mitigation measures under this rule. The Applicant has failed to provide any information to the contrary.

OCNGS's thermal discharge causes the water temperature at the mouth of Oyster Creek (over 1.5 miles away) to rise 3° to 5° C (5.4° to 9.0° F).[46] The thermal plume from OCNGS extends through the mouth of Oyster Creek and into Barnegat Bay for approximately one (1) mile.[47] At times, the plume extends out from the mouth of Oyster Creek and across the entire width of Barnegat Bay to the barrier beach on the other side, a distance of almost four (4) miles.[48] Both the draft NJDEP permit[49] and Summers *et al.* (1998)[50] found that the extent and width of the thermal plume often violates New Jersey surface water quality standards. Under the current NJPDES permit, water temperature in the discharge canal is permitted to reach 110° F,[51] which affects the behavior, physiology, and habitat utilization of aquatic organisms in Oyster Creek and Barnegat Bay.[52]

Water temperature is the determining environmental factor in the timing of blueback herring spawning migration[53]. Spawning runs begin in spring with a minimum water

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[44] *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, Supplement 28 for Oyster Creek Nuclear Generating Station, NUREG-1437, Final Report – Main Report (Jan. 2007), 4.0 Environmental Impacts of Operation, pg. 4-55.

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

[46] Id.

[47] Id.

[48] Donovan, O., et al. (1977) Thermal Plume Impact on Fish Distributions in Barnegat Bay. Bull. Amer. Lit. Soc. 10(3):14.

[49] 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

[50] 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.

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

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

[53] Loesch, J.G. (1987) Overview of life history aspects of anadromous alewife and blueback herring in freshwater habitats at 686, in *Common Strategies of Anadromous and Catadromous Fishes.* 1:89-103, M.J. Dadswell et al., eds., Am. Fish. Soc. Symp.

temperature of 14° C (57.2° F) and spawning ceases once temperatures exceed 27° C (80° F).[54] The timing of spawning with water temperature changes function to synchronize herring larval and zooplankton abundance, thus optimizing growth and survival of the year class. Copepods are the main food source of juvenile and adult blueback herring,[55] and there is a direct relationship between zooplankton abundance and their distribution, growth and feeding[56]. Elevated water temperatures associated with OCNGS operations not only disrupt vital spawning temperature cues, but can also alter the timing and composition of zooplankton availability. When OCNGS discharge temperatures reached 104.7 ° F, almost 100% mortality was recorded in copepods and invertebrate larvae.[57] This lethal temperature of 104.7 ° F is within the limits currently allowed for the plant.

The elevated temperature in the discharge canal and the thermal plume induces behavioral changes that have been documented in important managed species such as summer flounder, winter flounder, and tautogs.[58] Some of these behavioral changes include:

- Avoidance of parts or all of Oyster Creek by certain species during summer and early fall when overheated water acts as a barrier, resulting in an avoidance of parts or all of Oyster Creek by certain species during summer and early fall.

- Attraction of fish to parts or all of Oyster Creek during winter when they should migrate out of the area due to cold ambient temperatures causing elevated water temperatures to function as a trap. Failure to migrate forces fish to remain within the heated plume, which can lead to large-scale mortality (due to thermal shock) when the plant experiences a planned or emergency shut down.

    - Records from January 1972 through December 1982 reported 2,404,496 fish were killed due to thermal shock.[59]

    - An emergency shutdown on January 21, 2000 caused a 17°F drop in the water temperature in the discharge canal in 15 minutes. The rapid drop in temperature to 32°F resulted in the death of ~3,500 fish, including 2,980 striped bass.[60]

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[54] Pardue, G.B. (1983) Habitat Suitability Index Models: Alewife and Blueback Herring. US Dept. Int. Fish WildlServ. FWS/ OBS-82/1.0.58, 22 pgs.
[55] Burbidge, R.G. (1974) Distribution, Growth, Selective Feeding, and Energy Transformations of Young-of-the-Year Blueback Herring, Alosa aestivalis (Mitchill), in the James River, Virginia Trans. Amer. Fish. Soc. 103(2): 297-311.
[56] Id.
[57] Loveland, R.E., et al. (1972) The qualitative and quantitative analysis of the benthic flora and fauna of Barnegat Bay before and after the onset of thermal addition. Eighth Progress Report. August 18, 1972.
[58] Donovan, O., et al. (1977) Thermal Plume Impact on Fish Distributions in Barnegat Bay. Bull. Amer. Lit. Soc. 10(3):14
[59] Kennish, M.J., et al. (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.
[60] Oyster Creek Nuclear Generating Station Fish Kill Monitoring Report (January 2000) NRC ML#003684420

- An emergency shutdown on November 11, 2001 caused a 7°F drop in the water temperature in the discharge canal in 15 minutes. The rapid drop in temperature to 48°F resulted in the death of ~1,407 fish.[61]

- A scheduled shutdown on September 23, 2002 caused the water in the discharge canal to increase to 101°F in less than an hour and resulted in the death of ~6,000 fish.[62]

- Metabolic rate of organisms increases with increased temperatures resulting in decreased growth and survival,[63] especially during summer months when ambient water temperatures are at their peak.

  - Juvenile winter flounder exhibit sublethal effects such as reduced food conversion efficiencies and growth rates at 20° C (68° F) and feeding inhibition at 24°C (75° F).[64,65]

  - Winter flounder egg viability is reduced by 50% at 10°C (50° F) with mortality reaching 100% at 15°C (59° F).[66]

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

- 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.[67]

In addition, original hydrodynamic models of the thermal plume produced in the mid-1980s (and often cited by the Applicant) were extensively flawed and the consequent models produced by Summers *et al.* (1989) were based on these original flawed data. The resulting hydrodynamic modeling "was a poor reflection of the dynamic conditions characterizing Barnegat Bay and underestimated the size of the plume and its associated

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

[62] Cradic, A. 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

[63] Beitinger, T. L., et al. (2000) Temperature Tolerances of North American Freshwater Fishes Exposed to Dynamic Changes in Temperature. Environmental Biology of Fishes, 58(3):237 – 275.

[64] Frame, D.W. (1973) Biology of young winter flounder *Pseudopleuronectes americanus* (Walbaum); Metabolism under simulated estuarine conditions. Trans Am Fish Soc 2:423–430

[65] Casterlin, M.E., and Reynolds W.W. (1982) Thermoregulatory behavior and diel activity of yearling winter flounder, *Pseudopleuronectes americanus* (Walbaum). Environ Biol Fishes 7:177–180

[66] Williams, G.C. 1975. Viable embryogenesis of the winter flounder (*Pseudopleuronectes americanus*) from –8 to 15°C. Mar. Biol. 33(1):71-74.

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

isotherms.[68]" Therefore, these models can not be used to determine compliance. 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 be employed.

The Applicant has failed to demonstrate that its operations do not disrupt the timing or pattern of migration, the availability of prey, or the growth and survival of diadromous fish. As detailed above, available information indicates that in fact its thermal discharges do cause such disruptions, and therefore, the Applicant's operations are not consistent with the State's enforceable policy for Finfish Migratory Pathways.

D.3.2 Impingement and Entrainment

The once-through cooling system in operation at OCNGS induces significant mortality of eggs, larvae and adults of many of the diadromous species of concern that are protected by this regulation. The Applicant has failed to support their findings that current levels of impingement and entrainment mortality do not adversely impact spawning and nursery function of species of concern. Previous data found that American eel, river herring, and blueback herring[69,70] were among the many species impinged and/or entrained in the closed cycle cooling system of OCNGS. In fact, the blueback herring are consistently among the most common species impacted by OCNGS operations,[71] even as this species continues to experience significant population-level decline[72]. In the Final GEIS for OCNGS, the NRC acknowledged that operations may adversely impact populations already experiencing substantial declines:

> "For two Category 2 issues (entrainment of fish and shellfish in early life stages and impingement of fish and shellfish), the NRC staff determined that the existing once-through cooling system could have a MODERATE impact if species composition and abundance of aquatic organisms in Barnegat Bay have changed substantially from the 1970s and 1980s during which the last studies of the effects of OCNGS operations on bay-wide populations were conducted."[73] *(A similar statement was made regarding impingement).*[74]

We further note that the Applicant does not address the immense Biological Oxygen Demand (BOD) loadings into the Barnegat Bay system from OCNGS. The organic loading

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[68] 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-42.

[69] 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.

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

[71] Id.

[72] Atlantic States Marine Fisheries Commission, Information on Managed Species

[73] *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, Supplement 28 for Oyster Creek Nuclear Generating Station, NUREG-1437, Final Report – Main Report, (Jan. 2007) Executive Summary, pg. 21

[74] *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, Supplement 28 for Oyster Creek Nuclear Generating Station, NUREG-1437, Final Report – Main Report (Jan. 2007) 4.0 Environmental Impacts of Operation, Pg. 4-23

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.[75] 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 and nitrites/nitrates are formed, contributing to and creating hypoxic and eutrophic conditions. This is a significant environmental impact that should have been acknowledged and analyzed by the Applicant.

The Applicant must not be allowed to use unsupported statements and generalizations about bay-wide fish populations and habitat utilization, but instead must be required to provide scientifically-based references that support its findings of consistency with the Finfish Migratory Pathways regulation.

D.4 Submerged Vegetation Habitat (N.J.A.C. 7:7E-3.6)

The State's Submerged Vegetation Habitat policy generally prohibits development and activities in submerged vegetation habitat, or that would otherwise result in erosion or turbidity in waters supporting such habitat.[76] Submerged aquatic vegetation ("SAV") is considered to be a sensitive indicator of long-term water quality and is universally accepted in the scientific community as a mechanism for relating anthropogenic inputs to estuarine ecosystem health.[77] It is one of six environmental indicators chosen by the Barnegat Bay Estuary Program's Science and Technical Advisory Committee to examine the state of the Barnegat Bay. Hence, it is extremely important that the Applicant demonstrate its consistent with this enforceable policy.

According to a recent analysis using a time series of SAV maps dating back to 1968, SAV has all but disappeared from the western shore of Barnegat Bay north of Oyster Creek.[78,79] The time parameters of this analysis coincide with the development and operation of OCNGS. The substantial loss of SAV during this time period is further evidence of degradation of Bay water quality that makes it necessary to evaluate OCNGS's operations in the context of an impaired system, and the direct impact OCNGS may be having on SAV.

The Applicant concludes that *"nutrient enrichment and turbidity appear to be primary current stressors for SAV in Barnegat Bay...OCNGS is not a significant source of nutrients or sediments that produce turbidity"*. Yet, the Applicant has failed to address the significant nutrient enrichment that results from the ongoing organic loading into the Bay from the remains of entrained organisms discharged by OCNGS (see Section D.3.2. above). The current NJPDES permit does not require the Applicant to monitor BOD or dissolved oxygen levels in its discharged effluent, so the true significance of OCNGS as a nutrient source to the Bay is unknown. The combination of elevated nutrients and elevated temperatures within the thermal plume create optimal conditions for phytoplankton

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[75] O'Neil, C., et al. (1977). Biochemical Oxygen Demand (BOD) as a Measure of Entrainment Loss at a Nuclear Power Station. The Bulletin of the American Littoral Society. 10(3):14-18.
[76] N.J.A.C. 7:7E-3.6(b), (c).
[77] Dennison, W.C., et al. (1993), Assessing Water Quality with Submersed Aquatic Vegetation. BioScience, 43(2): 86-94
[78] Rutgers The State University of New Jersey, Grant F. Walton Center for Remote Sensing and Spatial Analysis (2006) Barnegat Bay-Little Egg Harbor Submerged Aquatic Vegetation Mapping.
[79] Barnegat Bay Estuary Program (2005) Characterization Report, The State of the Bay.

blooms[80] and benthic macroalgal overgrowth[81]. As acknowledged by the Applicant,[82] light attenuation resulting from these blooms and overgrowth prevents the growth and survival of SAV.[83] The Applicant has failed to show that OCNGS operations are not a significant source of nutrients or turbidity, two primary current stressors for SAV in Barnegat Bay. Accordingly, the Applicant has not demonstrated consistency with this policy, and given the present operations at OCNGS, it is likely that the Applicant cannot make such a showing.

D.5 Endangered or Threatened Wildlife or Plant Species Habitat (N.J.A.C. 7:7E-3.38)

This coastal policy prohibits development of, or activities on, endangered or threatened wildlife or plant species habitat, unless it is demonstrated through an impact assessment that such habitat would not directly or indirectly be adversely affected.[84] This is a particularly important requirement with regard to OCNGS because the plant (1) periodically impinges and kills endangered sea turtles, and (2) is located upon approximately 800 acres of important coastal habitat. State-listed species in the vicinity of OCNGS include the barred owl, Cooper's hawk, Northern pine snake, pine barrens treefrog and wood turtle.

The operation of OCNGS is not consistent with this policy because the plant has significant impacts on aquatic species, including endangered and threatened species. Plant records indicate 41 impingements and 15 mortalities of endangered sea turtles since 1992.[85] These data include the following species-specific incidents:

- 27 impinged Kemp's Ridley Sea Turtles with eleven (11) mortalities,
- Ten (10) impinged Loggerhead Sea Turtles with two (2) mortalities, and
- Four (4) impinged Green Sea Turtles with one (1) mortality.

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. The summer of 2006 again proved fatal for sea turtles when two (2) Loggerheads and four (4) Kemp's Ridley were impinged and one (1) Kemp's Ridley was killed on the intake screens of OCNGS.[86] The Kemp's Ridley is the most

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[80] Berg, G.M., et al. (1997) Organic Nitrogen uptake and growth by the chrysophyte *Aureococcus anophagefferens* during a brown tide event. Marine Biol. 129(2): 377-387

[81] Steffensen, D.A. (1976) The Effect of Nutrient Enrichment and Temperature on the Growth in Culture of *Ulva lactuca* L Aquatic Botany 2(4): 337-351.

[82] AmerGen, Federal Consistency Certification, Attachment A at 31.

[83] Kemp, M.W., et al. (2004) Habitat Requirements for Submerged Aquatic Vegetation in Chesapeake Bay: Water Quality, Light Regime, and Physical-Chemical Factors Estuaries 27(3): 353-377

[84] N.J.A.C. 7:7E-3.8

[85] Endangered Species Act, Section 7 Consultation, Biological Opinion for Oyster Creek Nuclear Generating Station (Nov 2006), NOAA/NMFS.

[86] Id.

endangered of all the sea turtles. The re-licensing of OCNGS will result in the continued killing and harassing of these sea turtles.

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 than four (4) mortalities).[87] In this latest 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*"[88] Based on the information provided by NMFS, it is appropriate to conclude the operations of OCNGS will at least have an impact on endangered wildlife in the Barnegat Bay.

Given these adverse impacts, N.J.A.C. 7:7E-3.8(b) explicitly requires the Applicant to perform an impact assessment of its operations, but the Applicant has failed to do so. Once again, the Applicant attempts to avoid the regulatory requirements by misconstruing the term "development" to pertain only to new development,[89] rather than its activities, as the CZM Rules provide.[90] In 2004, the Applicant did perform a limited impact assessment for terrestrial species only, and with regard to security upgrades on part of the undeveloped portion of the OCNGS site. Clearly, the scope of this assessment is too limited to satisfy this coastal policy.

Finally, it would appear that the Applicant ignored DEP's request to submit a list and mapping of all properties owned or under the control of the Applicant,[91] which we understand to have been inclusive of the 800-acre OCNGS site. In its Federal Consistency Certification, the Applicant gives no indication that it supplied any such mapping to DEP.[92]

For the above reasons, the Applicant has not shown consistency with the State's enforceable policy regarding Endangered or Threatened Wildlife of Plant Species Habitat.

D.6 Marine Fish and Fisheries (N.J.A.C. 7:7E-8.2)

The Applicant has not demonstrated (and cannot demonstrate) consistency with the State's enforceable policy for Marine Fish and Fisheries. This policy generally provides that any activity that would adversely impact marine fish, in terms of reproduction, spawning, migration, species diversity or abundance or other natural function, is discouraged.[93] Several marine fish and fisheries species of concern are impacted by impingement, entrainment, and thermal pollution created by OCNGS's once-through cooling system. Many of these same species are experiencing significant population declines[94], including blueback herring, summer flounder[95], winter flounder[96] and hard

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[87] 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.
[88] Id.
[89] AmerGen Federal Consistency Certification, Attachment A at 79, 80.
[90] N.J.A.C. 7:7E-1.8
[91] AmerGen Federal Consistency Certification, Attachment A at 81.
[92] Id.
[93] N.J.A.C. 7:7E-8.2(b).
[94] Atlantic States Marine Fisheries Commission, Interstate Fisheries Management Reports for Managed Species. available at www.ASMFC.org

clams[97,98]. Nevertheless, the Applicant has **refused** to conduct fisheries studies in Barnegat Bay, as requested by DEP.[99] It is as outrageous as it is scientifically invalid for the Applicant to suggest a consistency determination be made on its "assumptions"[100] derived from fish population studies that are over 20 years old. During that time, the health of Barnegat Bay and the abundance of several marine fish populations (including the hard clam)[101] has declined dramatically. Accordingly, there is no basis for a finding of consistency with this policy.

The Applicant's conclusion that operations of OCNGS are in compliance with this policy is fundamentally flawed for several reasons, including serious scientific issues with the studies and documents used, lack of recent bay-wide population data (DEP's request for same notwithstanding), significant ecological changes in the Barnegat Bay Estuary since such data were collected and lack of analysis on cumulative impacts. In the Applicant's attempt to show compliance with the regulations, they cite 20 year-old data on impingement, entrainment and bay-wide populations that were found to be scientifically flawed and deficient by many different scientists and analysts, including the often-cited report by Summers (1989)[102] and the NRC's Final GEIS[103]. In fact, in the Final GEIS, the NRC actually concluded that there is a lack of current information to adequately assess impacts of the plant operations:

> *"Because recent population data are not available, the NRC staff cannot arrive at a definitive conclusion concerning the current impact of entrainment associated with OCNGS."* [104] (A similar statement was made regarding impingement.[105])

In addition, the Applicant's use of incomplete, unreleased results from an ongoing research effort is inappropriate, especially as it is being used to demonstrate a scientifically invalid relationship between historic and recent population levels. There is no scientific support for the use of impingement and entrainment data collected from a specific location in the Barnegat Bay complex, to extrapolate to bay-wide population-level effects. This is particularly so when sampling locations

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[95] NOAA, National Marine Fisheries Service, Essential Fish Habitat Summer Flounder, *Paralichthys dentatus*, Life History and Habitat Characteristics. NOAA Technical Memorandum NMFS-NE-151

[96] NOAA, National Marine Fisheries Service, Essential Fish Habitat Winter Flounder, *Pseudopleuronectes americanus*, Life History and Habitat Characteristics. NOAA Technical Memorandum NMFS-NE-138

[97] Kraeuter, J. N., et al. (2003) Rehabilitation of the Northern Quahog (Hard Clam) (*Mercenaria mercenario*) by shelling – 11 years in Barnegat Bay, New Jersey. J. Shellfish Res. 22(1):61-67

[98] MacKensie, K. L. (2003) Comparison in invertebrate abundance in four bays of the Northeastern United States: two bays of sparse quahogs and two bays of abundant quahogs. Northeast Fisheries Science Center Reference Document 03-10

[99] AmerGen Federal Consistency Certification, Attachment A at 194; DEP Letter to T. Rausch (June 1, 2006).

[100] AmerGen Federal Consistency Certification, Attachment A at 194 ("AmerGen has **assumed** that the same relationship would be found to exist if there were recent data on populations in Barnegat Bay.")

[101] The term "marine fish" is defined to include the hard clam. See N.J.A.C. 7:7E-8.2(a).

[102] 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.

[103] *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, Supplement 28 for Oyster Creek Nuclear Generating Station, NUREG-1437,Final Report—Main Report (Jan. 2007), Pages 4-11 through 4-27.

[104] Id. at 4-16.

[105] Id. at 4-23.

exhibit features such as elevated water temperature, increased flow rates, dredged channels and disrupted flow conditions that are easily distinguishable from the rest of the complex.

The Applicant state its preliminary 2006 impingement and entrainment data indicate the once-through cooling system continues to impact the same species as past collection efforts, but at generally higher rates. Ten years worth of available impingement and entrainment data for OCNGS (1975-1985) reveals tens of thousands of winter flounder and blueback herring are impacted by the plant annually, with numbers exceeding 150,000 winter flounder and 103,000 for blueback herring in the 1978-79 study[106]. The populations of both of these species are considered to be in serious decline in the northeast, which has led to aggressive fisheries management action by the Atlantic States Marine Fisheries Commission in an effort to protect, enhance and restore the stocks.[107,108] The dramatic decline of the hard clam (*Mercenaria mercenaria*) population in Barnegat Bay is also well documented.[109] As cited in Section D.2 above, available data for OCNGS indicates billions of hard clam larvae are entrained annually.

The NRC also recognized the potential impact of entrainment on declining populations in the Final GEIS for OCNGS:

> *"Recently, the status of winter flounder stocks has been a concern of fisheries management agencies along the eastern seaboard. The southern New England mid-Atlantic stock abundance of winter flounder has continued to decline despite fishery management efforts intended to reverse this trend (ASMFC 2005[110]). If future monitoring efforts demonstrate a similar decline in Barnegat Bay, the ongoing entrainment losses at OCNGS will need to be considered as part of an integrated management program to address this issue."*[111]

As stated above, there are several unique environmental conditions surrounding the plant that can act to either aggregate or eliminate certain species from the area. Therefore, data collected within the area affected by OCNGS operations will not provide an accurate assessment of the actual composition and abundance of species that occupy the remaining Barnegat Bay system. In the Applicant's attempt to show compliance with this regulation, they inappropriately elevated an untested hypothesis to the status of a conclusion when they stated:

> *"Therefore, AmerGen expects that the consistency between historic and current impingement and entrainment data is representative of the consistency between historic and current populations. Because the recent data are within the range of variability exhibited in the historic fish and invertebrate collections, because the species diversity is similar between the two collection periods, and because OCGS operations have not changed, it is*

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[106] 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.

[107] Atlantic States Marine Fisheries Commission (2005) Amendment 1 to the Interstate Management Plan for Inshore Stocks for Shad and River Herring. Fisheries Management Report # 43, available at www.asmfc.org

[108] Atlantic States Marine Fisheries Commission (1999) Amendment 1 to the Interstate Management Plan for Inshore Stocks for Winter Flounder. Fisheries Management Report # 35, available at www.asmfc.org

[109] Shellfish Stock Assessment of Little Egg Harbor Bay. (2003) New Jersey Department of Environmental Protection

[110] Atlantic States Marine Fisheries Commission (2005) Amendment 1 to the Interstate Management Plan for Inshore Stocks for Winter Flounder. Fisheries Management Report # 43, available at www.asmfc.org

[111] *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, Supplement 28 for Oyster Creek Nuclear Generating Station, NUREG-1437, Final Report – Main Report (Jan. 2007), 4.0 Environmental Impacts of Operation, Pg. 4-16

reasonable to conclude that the operation of OCGS continues to not adversely impact the natural functioning of marine fish in Barnegat Bay, including the reproductive, spawning, and migratory patterns, or species abundance or diversity."[112]

An alternative (and more plausible) hypothesis is that OCNGS operations continue to impinge and entrain high numbers of winter flounder, summer flounder, American eel and hard clams despite mounting evidence of population-level declines of these impacted species[113,114,115] because the water quality conditions created by OCNGS operations functions to attract and consequently aggregate these species, thus subjecting a greater percentage of the overall bay-wide population to impingement, entrainment and thermal stress.

These are just two of several different untested hypothesis that could be proposed based on these three data sets, all of which would need to be tested and supported with data and scientific literature. Not to be mistaken with scientifically-valid conclusions, which require considerably greater weight of scientific evidence for support. The ongoing high rates of impingement and entrainment raise legitimate concerns about the plant's adverse impacts on the natural functioning of marine fish, including the reproductive, spawning and migratory patterns of species abundance or diversity of marine fish. Therefore, the Applicant has failed to demonstrate consistency with Marine Fish and Fisheries policy.

We further note that the Applicant's pursuit of habitat restoration (and its reliance thereon to satisfy the requirements of this rule) has proven to be misguided. The Second Circuit Court of Appeals has invalidated the EPA Phase II Rule so far as it would have allowed the Applicant to substitute habitat restoration for technological improvements designed to substantially reduce impingement and entrainment.[116] In fact, we understand that EPA has effectively suspended the entire Phase II Rule,[117] and therefore, it is entirely inappropriate for the Applicant to speculate as to what benefits (if any) may result from the requirements of any NJPDES permit renewal.

D.7 Water Quality (N.J.A.C. 7:7E-8.4)

The State's Water Quality policy prohibits any coastal development or activity that would violate the federal Clean Water Act or State laws or regulations promulgated thereunder.[118] DEP has advised the Applicant that its successful attainment, acceptance and compliance with a Final NJPDES Permit will satisfy this policy.[119] Because it has not received or accepted a Final NJPDES permit, the Applicant has not demonstrated consistency with this policy at this time.

It is presently unknown when the Applicant will obtain a Final NJPDES. The Applicant's "current" permit expired in 1999, and its renewal has been pending for nearly nine (9) years. A draft

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[112] AmerGen Federal Consistency Certification, Attachment A at 194.
[113] Atlantic States Marine Fisheries Commission, Information on Managed Species
[114] NOAA, National Marine Fisheries Service, Essential Fish Habitat Summer Flounder, *Paralichthys dentatus*, Life History and Habitat Characteristics. NOAA Technical Memorandum NMFS-NE-151
[115] NOAA, National Marine Fisheries Service, Essential Fish Habitat Winter Flounder, *Pseudopleuronectes americanus*, Life History and Habitat Characteristics. NOAA Technical Memorandum NMFS-NE-138
[116] Riverkeeper, Inc. v. EPA, No. 04-6692 (2d Cir. Jan. 25, 2007).
[117] EPA Memo dated March 20, 2007 (enclosed).
[118] N.J.A.C. 7:7E-8.4.
[119] DEP Letter to T. Rausch (June 1, 2006).

renewal permit was finally circulated for public comment in the Fall of 2005. Among other things, this delay has allowed the Applicant to avoid updated requirements of Section 316(b) of the Clean Water Act, which require nuclear power plants to implement the best technology available for their cooling water intake structures.

However, we do not anticipate that the draft permit will be made final, because it contains a Section 316(b) compliance alternative that is no longer valid. Now that the Second Circuit has invalidated habitat restoration as a "best technology available", DEP cannot incorporate this alternative to closed-cycle cooling in the Final NJDEP Permit, and has further been instructed by EPA to use its Best Professional Judgment [120]. Accordingly, the draft permit will have to be revised and then re-noticed for another round of public review and comment. Thus, it is not clear when (or if) a Final NJPDES Permit will be issued (or what its substantive requirements will be in this regard).

There are several reasons to doubt that the Applicant will operate in accordance with the CWA once its permit is obtained. Section 316(a) of the federal Clean Water Act requires that thermal dischargers, at a minimum, must comply with limits that will "*assure the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife*"[121] in the receiving water. As stated in Section D.3 above, the NRC expressed doubt as to whether the Applicant meets this standard, and for good reason. The Applicant has not demonstrated that its thermal discharges meet this standard and, as detailed above, the opposite would appear to be true. For instance, the thermal discharge of OCNGS is responsible for numerous fish kills, including three (3) of 1,400 or more in the last eight (8) years, as noted in Section D.3.1 above. The plant's outdated and destructive cooling water system impinges and entrains billions of marine organisms each year.[122] The entrained organisms result in substantial amounts of Biological Oxygen Demand (BOD) being discharged,[123] which can result in fish kills due to hypoxia. The plant also discharges significant concentrations of Chlorine, which is responsible for at least one additional fish kill.[124] Accordingly, the OCNGS is a clear threat to the protection and propagation of fish, and, as noted above, the Applicant has refused to conduct any studies to show otherwise.

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[120] EPA Memo dated March 20, 2007 (enclosed).
[121] CWA § 316(a), 33 U.S.C. 1326(a).
[122] 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.
[123] O'Neil, C., et al. (1977) Biochemical Oxygen Demand (BOD) as a Measure of Entrainment Loss at a Nuclear Power Station. Bull Amer Litt Soc 10(3):14-19.
[124] Kennish, M.J. (2001) Characterization of Barnegat Bay-Little Egg Harbor Estuary and Watershed. Journal of Coastal Research, SI 32:3-12.

E. RECOMMENDATION

For the reasons set forth above, the Undersigned Parties urge DEP to reject the application of AmerGen for concurrence with its Federal Consistency Certification regarding the Oyster Creek Nuclear Generation Station. The Applicant has failed to demonstrate that the continued operation of OCNGS is consistent with many of the State's enforceable policies. In light of the many adverse environmental impacts OCNGS has on the Barnegat Bay Estuary, it is clear that the continued operation of OCNGS would be patently inconsistent with and detrimental to these important coastal policies.

Sincerely yours,

CLEAN OCEAN ACTION

By: _____
Cindy Zipf, Executive Director

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

By: _____
Kari L. Martin, Policy Communications Dir.

SAVE BARNEGAT BAY

By: _____
William deCamp, Jr., President

ASBURY PARK FISHING CLUB

By: _____
Joe Pallotto, President

SURFRIDER FOUNDATION

By: _____
John Weber, East Coast Regional Manager

WATERSPIRIT

By: _____
Suzanne Golas, csjp

AMERICAN LITTORAL SOCIETY

By: _____
Tim Dillingham, Executive Director

NY/NJ BAYKEEPER

By: _____
Andrew Willner, NY/NJ Baykeeper

RARITAN RIVERKEEPER

By: _____
Bill Schultz, Raritan Riverkeeper

FISHERMAN'S DOCK CO-OP, INC. OF POINT PLEASANT, NJ

By: _____
Jim Lovgren, Representative

NATURAL RESOURCES PROTECTIVE ASSOCIATION

By: _____
Kerry Sullivan, Executive Director

By: _____
Ida Sanoff, Chairperson

By: _____
Jim Scarcella, Trustee

Enclosure

cc: Lisa Jackson, NJDEP Commissioner
Ruth Ehinger, Office of Coastal Zone Management
Congressional Delegates
New Jersey Assembly Environmental and Solid Waste Committee

Open Letter

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

MAR 20 2007

MEMORANDUM

OFFICE OF WATER

SUBJECT: Implementation of the Decision in *Riverkeeper, Inc. v. EPA*, Remanding the Cooling Water Intake Structures Phase II Regulation

FROM: Benjamin Grumbles, Assistant Administrator

TO: Regional Administrators

The purpose of this memorandum is to provide guidance on the status of the Cooling Water Intake Structures Phase II regulation under section 316(b) of the Clean Water Act ("Phase II rule" or "Rule"). The Phase II rule set national standards for cooling water withdrawals by large, existing power producing facilities ("Phase II facilities"). See 40 C.F.R. Part 125 Subpart J; 69 Fed. Reg. 41576 (July 6, 2004).The Second U.S. Circuit Court of Appeals recently issued its decision in the litigation over the Phase II regulation. See Riverkeeper, Inc., v. EPA, No. 04-6692, (2d Cir. Jan. 25, 2007).

The court's decision remanded several provisions of the Rule on various grounds. The provisions remanded include:

- EPA's determination of the Best Technology Available under section 316(b);
- The Rule's performance standard ranges;
- The cost-cost and cost-benefit compliance alternatives;
- The Technology Installation and Operation Plan provision;
- The restoration provisions; and
- The "independent supplier" provision.

With so many provisions of the Phase II rule affected by the decision, the rule should be considered suspended. I anticipate issuing a Federal Register notice formally suspending the Rule in the near future.[1] In the meantime, all permits for Phase II facilities should include conditions under section 316(b) of the Clean Water Act developed on a Best Professional Judgment basis. See 40 C.F.R. § 401.14.

If you have questions regarding the application of section 316(b) at Phase II facilities, please contact either Janet Goodwin with the Office of Science and Technology at 202-566-1060 (goodwin.janet@epa.gov) or Deborah Nagle with the Office of Wastewater Management at 202-564-1185 (nagle.deborah@epa.gov).

[1] In the event that the court's decision is overturned prior to publication of the Federal Register notice, then I will not proceed to effect the suspension; if the court's decision is overturned after publication of the notice, the Agency will take appropriate action in response.