



## State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Environmental Regulation

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September 11, 2006

Chief, Rules Review and Directives Branch  
U.S. Nuclear Regulation Commission  
Mail Stop T6-D59  
Washington, DC 20555-0001

**RE: Oyster Creek Nuclear Generating Station  
Generic EIS for License Renewal of Nuclear Plants**

### **Comments**

Dear Sir or Madam:

The New Jersey Department of Environmental Protection (NJDEP) has completed its review of the Generic Environmental Impact Statement (GEIS) for License Renewal of Nuclear Plants regarding Oyster Creek Nuclear Generating Station. We offer the following comments, for your consideration, regarding existing and potential adverse impacts to the environment State of New Jersey associated with the continued operation of the generating station.

### **COMMENTS**

#### **Radiation Protection**

The NJDEP's Radiation Protection and Release Prevention Element's (RPRP) review of the GEIS has resulted in the following comments and concerns, which are, directed to specific impact areas.

#### **Plant and the Environment, Gaseous waste processing systems and effluent controls (Pages 2-11 to 2-12)**

The GEIS states that "continuous radiation monitoring is provided at various points in the system" and that "all gaseous effluents are within the NRC regulatory limits". There is no discussion of the operability/inoperability of the augmented offgas system (AOG) which over the past few years has not functioned at 100% at all times. Operating the AOG at or near 100% will provide

the public with confidence that any offsite releases are kept as low as reasonably achievable and well below NRC regulatory limits. It is therefore important that AmerGen commit to high reliability of the AOG at or above 90%.

### **Plant and the Environment, Radiological Impacts (Page 2-75)**

Following is a clarification of the Department's Environmental Sampling and Monitoring Program (ESMP). Data are collected not only beyond the owner controlled area, but at various locations onsite:

- Groundwater sampling is done within the OCNGS site boundary. Tap water is sampled from the OCNGS site Administration Building
- Direction radiation measurements using Thermoluminescent Dosimeters are taken at various locations within the OCNGS site boundary, including the Independent Spent Fuel Storage facility.
- Continuous Radiological Environmental Surveillance Telemetry – Three portable ion chamber devices (CREST monitors) measure direct radiation at various locations within the OCNGS site boundary, including the Independent Spent Fuel Storage Facility.

### **Environmental Impacts of Operation, Heat Shock (Page 4-23, Lines 4-7)**

"...shall not be raised by no more than 2.2 degrees C (4 degrees F) from June through August, nor more than 0.8 degrees C (1.5 degree F) from June through August..."

This statement conflicts.

### **Environmental Impacts of Operation, Thermal Plume extent violations (Page 4-23)**

Supplement 28 to the Draft SEIS is not clear on what the outcomes of the violations were.

### **Environmental Impacts of Operation, Transmission Lines (Pages 4-25 through 4-31)**

New Jersey's original draft power line regulation addressed only new or modified lines. The policy of prudent avoidance was used as a basis for the draft. Therefore, only new or modified power lines were to use mitigation techniques to lower magnetic fields. (It was assumed that more of these fields were worse.)

Many years later, research results are still contradictory in this area. The International Commission on Non-ionizing Radiation recommends 833 milligauss as a public exposure limit, based on acute effects. No power line in New Jersey

will have levels that high underneath them. IEEE recommendations are even less conservative.

Since no new transmission lines are within the scope of this GEIS (2-15, line 25 and 26), it would not be recommended that the utility take any action to reduce magnetic fields.

The RPRP does not see any data in the report that indicates what the magnetic fields are under or at the edge of the ROW (average and maximum). The Department is requesting this information in order to respond to public inquiries. The Department is concerned that electric current could substantially increase over the years thus increasing the magnetic field under the line. What is the utility's plan for this eventuality?

#### **Environmental Impacts of Operation, Radiological Impacts of Normal Operations (Page 4-31)**

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

Another twenty years of operation will impact the size of the interim spent fuel storage facility. What are the dose estimates for what the public might be exposed to at the fence line throughout the operation of the OCNGS ISFSF pending the siting of a permanent repository?

#### **Environmental Impacts of Operation, Radiological Impacts of Normal Operations (Page 4-31)**

During normal plant operations, a certain portion of effluent from the discharge canal is recirculated back through the intake canal. This recirculation may potentially contain radioactive material from the OCNGS that can settle in the aquatic sediment in the intake canal and Forked River. Was sampling of aquatic sediment in the intake canal performed to assess any potential impacts?

#### **Environmental Impacts of Postulated Accidents (Pages 5-1 through 5-11, Appendix G)**

In light of NRC approved NEI 05 01 (rev A) Severe Accident Mitigation Alternatives (SAMA) Analysis Guidance Document, AmerGen should revise the draft SEIS. The submittal did not include a specific review for Individual Plant Examination for External Events (IPEEE). The information used to develop the basis for external events such as tornados, floods, earthquakes, fires, and sabotage is 10 years old. Additionally, while Amergen did use specific information for the internal Individual Plan Examination, they did not use the same method for the IPEEE and simply applied a factor of 2 to make a risk determination. This method is clearly imprecise and may result in incorrect

judgments. The list of potential fixes to improve the plant, which is located in Appendix G of the GEIS, may not be accurate as a result of this generic analysis.

Finally, the Severe Accident Mitigation Alternatives (SAMA) submitted by AmerGen, while in compliance with NRC's regulations but not with guidance document NEI 05 01 (rev A), did not take into account terrorism events such as attacks involving large commercial aircraft. As the NRC is aware, the State of New Jersey has filed a contention with the Atomic Safety Licensing Board (ASLB) regarding this issue. While the ASLB argued that under the National Environmental Protection Act, license renewal does not have to consider very low probability events, after September 11, 2001, these events can no longer be considered zero probably. At present, the NEPA-terrorism debate continues with the NRC Commissioners' review of the SAMA contention. The Ninth Circuit Court decision held that the NRC cannot categorically refuse to perform a NEPA-terrorism review. The legal process will continue until resolution which may result in the Ninth Circuit Court decision being upheld thereby requiring the NRC to include terrorism in NEPA reviews. Judgments on the state's contention regarding SAMA seem relevant for the continued operation of the Oyster Creek Nuclear Generating Station (OCNGS) and should be included for public assurance of the continued safe operation of the OCNGS.

As Commissioner Gregory B. Jaczko stated in a Memorandum and Order docketed on September 6, 2006, that considered the appeals of two prior ASLB decisions, an evaluation of terrorism events should be part of NEPA and that this process should start immediately in order to provide the necessary clarity for all future re-licensing of nuclear power plants.

The Department is requesting that NRC make the OCNGS spent fuel pool (SFP) vulnerability analysis available to the Department since the SAMA does not include security requirements pertaining to the revised design basis threat analysis, including SFP vulnerability and aircraft attacks.

#### **Environmental Impacts of Decommissioning, (Pages 7-1 through 7-5)**

10 CFR 50.75(g) requires AmerGen to keep "records of information important to the safe and effective decommissioning" of the plant. Since Oyster Creek is at the end of an initial license, seeking re-licensing, the Department is requesting a copy of the OCNGS's 50.75(g) file.

#### **Alternatives, Description of the Closed-Cycle Cooling Alternatives (Pages 8-5 through 8-6)**

Would the excavation of piping have any effect on any of the existing groundwater monitoring network?

## **Alternatives, Environmental Impacts of the Closed-Cycle Cooling Alternative, Terrestrial Ecology (Pages 8-6 through 8-21)**

During the planning of the proposed Forked River Nuclear Station in the 1970's, the EIS study was done for a different type of cooling tower (draft rather than linear hybrid model), different location and different release point/height. Therefore, the comparisons about salt deposition patterns described in Supplement 28 may be different and therefore produce different results.

## **Environmental Impacts of the Closed-Cycle Alternative, Land Use (Page 8-8)**

We are not aware of any decision based on CAFRA that would preclude the construction of the cooling basin and towers.

## **Summary of Environmental Impacts of a New Nuclear Facility Using Closed-Cycle Cooling at the OCNGS Site and at an Alternate Site (Tables 8-1 and 8-7)**

Environmental impacts of a new nuclear facility using closed-cycle cooling either at the OCNGS site or an alternative site in some cases are listed as SMALL to MODERATE or even MODERATE to LARGE in Table 8-7. Yet, environmental impacts of the current once-through cooling system and closed-cycle cooling alternatives in Table 8-1 both resulted in mostly SMALL impacts. Can you elaborate on the reasoning for choosing the MODERATE and MODERATE to LARGE impact ratings for a new nuclear facility with a cooling tower constructed on the OCNGS site? It seems that at least more of these impacts would be SMALL.

## **Natural Resources**

The NJDEP's Division of Fish and Wildlife's (DFW) review of the GEIS has resulted in the following comments and concerns, which are, directed to specific impact areas.

### **Biocide Usage**

The DFW has concerns about the cumulative impact of the use of chlorine and biocides on estuarine organisms. No mention was made if any studies or modeling has ever been performed to examine potential long-term impacts of this procedure.

### **Fishkill Measurements**

The DFW has some concerns regarding the methodology used to measure fishkills. Entrained fish eggs and fish larvae are subjected to extremely

high temperatures where mortalities are high. Cold shock due to unexpected shutdowns results in more fish mortality than observed or reported. When a plant shuts down and a fish kill occurs, dead fish are collected and enumerated. What is not observed are the schools of fish that follow the last "pocket" of warm water discharge out Oyster Creek and into Barnegat Bay. During the winter, as that "pocket" of warm water is cooled to the temperature of the water around it, those remaining fish (now off site of the OCNCS) and in Barnegat Bay, succumb to thermal shock. During the winter, the cold water slows the decomposition process down dramatically, and the dead fish sink to the bottom. The extent of this mortality should be evaluated.

### **Fishkill Mitigation**

Pages 2-21 and 4-7 address fishkills related to plant shutdowns. It should be stressed that whether such fishkills occurred during planned or unplanned shutdowns, any resultant fishkills are subject to the assessment of fines.

### **Mesh Size Measurements**

Several present DFW staff members took part in the '84-'86 study before joining the DFW. The DFW believes that there are statements in the report that are misleading and require some clarification. Pages 4-18 to 4-19, suggest the EA study over underestimated catch due to mesh size not matching mesh size of Ristroph screens. The GEIS indicates that 10.7 mm was used on sampling gear for nine years, 6.4 mm used for one year, whereas mesh size on screens was 9.5 mm. The DFW staff believes all openings except for the last year were 3/8" (this is 9.5 mm). The difference is how mesh size is measured and whether or not the wire around each individual panel is included. The DFW believes that measurements reported by environmental assessment included the thickness of wire surrounding each opening (because that's how it was ordered from the supplier at the time), which would add another mm or so to the width. Pages 4-18 to 4-21 - the 6.4 mm wire mesh utilized in the pool, the DFW believes, it would not have mattered what size was used on the fabric mesh of the collection net, since anything in the sluiceway experienced the effects of the screening process and would have been retained in the pool. Water in the sluiceway could have been sampled with 1/2" mm mesh and the method still would have been valid because the sample would end up in the pool and be processed.

### **Important Fish and Shellfish (Section 2.2.5.3)**

Important Fish and Shellfish near the OCNCS are discussed in Section 2.2.5.3. Along with a "species profile" for important species in the area, the GEIS includes the general statement (or variation thereof) that "primary anthropogenic stressors include hydrologic changes resulting from water diversion or water withdrawal activities." This water diversion/withdrawal (up to 1.25 million g.p.m.) is the principal source of the DFW's concern, yet in many respects is dismissed,

perhaps as an unavoidable adverse impact in the opinion of some. Other potential sources of impact typically mentioned include eutrophication and stormwater runoff, which are probably included for completeness but may be included to divert attention away from the potential factor that is the focus of the GEIS. This section of the report also notes whether or not essential fish habitat for a particular species has been designated for Barnegat Bay and seems to infer that if there is no such essential fish habitat (EFH) designation, that species is not an issue for the OCNGS. Given the huge volumes of water taken in by the once-through cooling system and the losses of various fish and invertebrate species through impingement and entrainment mortality, it seems plausible that the plant operation is impacting the estuarine food web of Barnegat Bay in some manner even though there as yet may not have been significant, documented impacts to specific species. Has any effort ever been made to look at long-term impacts to the food web of the bay?

### **Pool Abundance Estimates**

On page 4-18 - the statement that the pool being an overestimate of abundance, DFG staff disagrees mainly because smaller, soft-bodied fishes (e.g. bay anchovies) could go through the 3/8" mesh of the screens (i.e. go head first instead of being sideways), be crushed or eaten, be trapped between the screens and feeding predators, get mangled in eel grass and therefore not end up in the sluiceway to be counted. If anything, it is the opinion of our professionals that pool collections grossly underestimated abundance of smaller, soft-bodied fishes and macroinverts such as bay anchovies, silversides, sand and grass shrimp. So basically, the last year of sampling, which utilized the pool technology, was most likely more reflective of abundance than in previous years (not an overestimate as stated in the NRC report), but it still underestimated numbers of small fish and small macroinvertebrates.

### **Entrainment of Phytoplankton and Zooplankton (Page 4-7)**

The DFW does not agree with the following: references the General EIS for power plants and concludes that 'entrainment of phytoplankton and zooplankton has not been found to be a problem at operating nuclear power plants'---a remarkable conclusion based on the losses to benthic infauna (including hard clams) as noted in the GEIS.

### **Dissolved Oxygen Issues (Page 4-8)**

The DFW requests additional information on the position stated on this page, "that low D.O. has been a problem at one nuclear power plant with a once through cooling system, but that it has been effectively mitigated." This section further adds that low D.O has not been a problem at plants with cooling towers or cooling ponds. Has low D.O. ever been an issue at the OCNGS and if so, how was this situation mitigated? Or does it require mitigation?

## **Fish and Shellfish Entrainment Mitigation (Page 4-11)**

It is noted that "entrainment of fish and shellfish into the cooling water system is a potential adverse impact." This section notes that as part of the permit renewal process, the applicant may be required to alter the intake structure, redesign the cooling system, modify station operation, or take mitigative measures as a result of this regulation." The GEIS should be considering all these actions and in any case should require mitigation for the fish and shellfish resources impacted by the relicensing of the OCNGS.

## **Entrainment Losses (Table 4-3, page 4-13)**

The Versar report (1989) noted that blue crabs and hard clams were the two species of both recreational and commercial importance impacted by the OCNGS. Table 4-3 (page 4-13 of GEIS) indicates that the annual entrainment losses for the studied period of 1975-1981 for blue crab larvae was 182 million organisms. Annual losses for this same period for hard clam larvae was 112.3 billion organisms. However, the GEIS makes little mention of the OCNGS impact on the bay's population of these two species. With respect to blue crabs, the GEIS discusses NMFS commercial blue crab landings and indicates that there is a thriving recreational blue crab fishery in Barnegat Bay, "suggesting that the population of blue crabs are currently sufficient to sustain both commercial and recreational uses." Using the current state of the recreational fishery to reach this conclusion seems somewhat of a "stretch".

Despite the huge losses of larval clams attributed to plant operation, in discussing the decline of hard clams in Barnegat Bay, the GEIS addresses a number of other factors, none of which include larval losses due to entrainment. It even include a reference to QPX disease, which typically occurs only in clams stressed by high density conditions--which is not the case in Barnegat Bay, where hard clam densities have fallen dramatically. For example, a survey of the southern portion of the Barnegat Bay System south of the Route 72 causeway (an area typically referred to as Little Egg Harbor Bay), hard clam stocks declined by two-thirds between the DFW surveys in 1987 and 2001. We may now be at a point of "recruitment limitation, "where densities are so low that the successful union of gametes released into the water is greatly diminished. With respect to declines in hard clam stocks in Barnegat Bay, the GEIS provides some interesting related data in its discussion of benthic infauna (pages 2-47/48). The GEIS notes that the densities of three benthic invertebrate species studied decreased from 9,000 to 17,000 individuals per square meter in 1969 to less than 500 individuals per square meter in 1973 (a decline of 94.1 to 97.1%). Coincidentally, the OCNGS began operation in December of 1969. It's not inconceivable that the entrainment losses reported for hard clams occurred for numerous larval organisms (both invertebrates and vertebrates), thereby having significant, albeit undocumented impacts on the bay ecosystem.



## Mitigation Need

While impacts to some species are mentioned there is no accounting for the loss of various early life stage aquatic organisms and the loss of migratory birds and other terrestrial species cause as direct or indirect impacts to the plant and/or the transmission lines associated with the development. It is the DFW's position that some type of mitigation is required for these past negative impacts and for any future impacts arising from the granting of re-licensing. The DFW suggests that as part of the relicensing process an estuary enhancement program should be developed and implemented to mitigate for these past cumulative impacts and future impacts.

## Estuary Enhancement Program Design

If an estuary enhancement program is developed, the DFW suggests that the following areas should be included into any mitigation plan:

1. Areas of potential restoration should be identified and slated for a program similar in design to the PSEG Estuary Enhancement Program. The DFW realizes that the potential for restoration is much more limited in the area of Barnegat Bay as compared to the Delaware Bay. All areas of marsh dominated with *Phragmites australis* or where hydrology may be restored to provide salt marsh habitat as part of the overall plan.
2. Work with the DFW's Bureau of Freshwater Fisheries to provide anadromous fish ladders at Manahawkin and Pohatcong Lakes and provide low flow fish passage at other low head dams located within the Barnegat Bay estuary.
3. Create a project within the Conserve Wildlife Foundation of NJ with a goal of being able to assess the use of Barnegat Bay and adjacent offshore areas by marine turtles, marine mammals and seals. Develop specific recommendations for their conservation in this area including measures for avoidance and/or minimization of cooling water intake losses. It appears as though many of the turtles reported at the plant come in during high easterly winds and/or drops in temperature (either the day before or day of capture). A modeling project could be developed to look at these factors, along with variables such as proximity of the Gulf Stream, to predict the times when turtles are most likely to be impinged. The plant should institute increased surveillance, including more frequent examination of the trash racks and canals (even include boat surveys), when turtles are most likely to be present.
4. Provide funding to the DFW's ENSP Bureau to evaluate the use of Right of Ways (ROWs) by Pineland snakes and federally protected avian species and develop specific recommendations for how ROWs can be managed within the Pinelands to benefit these species.

5. Work with DFW on the restoration, preservation and mapping of submerged aquatic vegetation within Barnegat Bay.
6. Conduct a finfish inventory of Barnegat Bay for all life stages. This inventory would be of value for the development of baseline data to be better to assess positive and/or negative impacts of future actions.
7. Provide financial support on a yearly basis of the hard clam restoration project mentioned under Page 4-11 with consideration being given to including bay scallops as technology develops.
8. Financial support should be provided to the DFW to assist with funding for the Sedge Island Marine Conservation Zone educational programs.
9. Public Access - fishing, boat ramps, shoreline boardwalks and fishing piers (handicap accessible).
10. Provide additional funding for Artificial Reef projects expenses (vessel cleaning, procuring reef material, etc.).
11. Provide funding support for Clean Vessel Act pump out facilities/education.
12. Provide funding support for Youth fishing programs like HOFNODS.

If there are any questions concerning these comments please feel free to contact Donald Wilkinson of the DFW staff at (856) 785-2711.

### **Water Quality**

The NJDEP's Division of Water Quality has the following comments on the draft GEIS. In most instances, an excerpt from the GEIS has been included after the comment and referenced page number along with any suggested changes where underlined text indicates an addition and strikethrough text indicates deletion.

#### **Page 2-20**

Comment: The following additions will serve to clarify the appropriate regulations:

A provision of the CWA and NJPDES regulations allows facilities to continue to operate under an expired permit provided that the permittee makes a timely renewal application, which is the case with OCNGS.

In July 2004, the EPA issued Phase II regulations for existing electric-generating plants that meet eligibility criteria as set forth at 40 CFR 125.91 including a total design intake flow of 50 MGD or more...

**Page 2-24**

Comment: The units seem to be in error and have been corrected below:

A concentration of 1000  $\mu$ g/L was measured, which exceeds the State limit of 70  $\mu$ g/L...

**Page 2-28**

Comment: The following statement seems to make an erroneous reference as Warren County does not border Philadelphia.

To the northwest, Warren County (~~bordering Philadelphia~~) is designated as a sulfur dioxide nonattainment area...

**Page 4-6**

Comment: The following statement is included on page 4-6:

These discharges have not been found to be a problem at operating nuclear power plants with cooling-tower-based heat dissipation systems and have been satisfactorily mitigated at other plants....

This finding concerns cooling-tower based dissipation system, which does not currently include OCNGS as it has a once-through cooling system. This should be corrected in any final document.

**Page 4-11**

Comment: This statement should be clarified to reflect the lack of definition for adverse environmental impact in the Phase II regulations:

While adverse environmental impact is undefined in the EPA Phase II 316(b) regulations, Eentrainment of fish and shellfish into the cooling-water system is a potential adverse environmental impact...

Comment: The following sentence needs to be better worded and the threshold level of eligibility under the Phase II regulations should be included for clarification purposes:

~~The rule is Phase II in the EPA's development~~ EPA has developed of Phase II 316(b) regulations that establish national requirements applicable to the location,

design, construction, and capacity of cooling water intake structures at existing facilities that exceed a 50 MGD threshold value for water withdrawals....

Comment: These sentences as written are factually incorrect in their description of the Phase II 316(b) regulations and required compliance with such. Specifically, only two of the five compliance alternatives contained in the Phase II regulations require compliance with national performance standards. In addition, compliance with any performance standards is not required at the time of permit renewal although any issued permit could attain a schedule for compliance. Suggested wording to correct these inaccuracies is as follows:

This rule allows for five compliance alternatives where two of these alternatives concern attainment of the —The new performance standards are designed to significantly reduce entrainment losses resulting from plant operations...

Licensees are required to demonstrate compliance with the Phase II regulations performance standards at the time of renewal of their NPDES permit...

#### **Page 4-12**

Comment: A reference to a later part of the document should be included to ensure that the reader understands that these underestimates were accounted for.

Thus, on the basis of the Summers et al. (1989) analysis, it is possible that the entrainment numbers presented by EA (1986) were underestimates of actual entrainment. However, as described on page 4-14, these numbers were adjusted for the purposes of evaluating impacts...

#### **Page 4-13**

Comment: Because there is documented entrainment survivability via the dilution pumps, as referenced in studies conducted at OCNGS, a clarifying statement that the estimation of impacts via the Versar report is conservative should be included.

Because the 316(a) and 316(b) demonstration report did not provide estimates of circulating-water system macrozooplankton entrainment losses for each year or estimates of dilution pump entrainment losses, Summers et al. (1989) conservatively estimated losses by assuming a 100 percent mortality rate for all entrained organisms (circulating-water system and dilution pumps)...

#### **Page 4-15**

Comment: On page 4-15, the following is stated with respect to entrainment losses and the resulting conclusions of the Summers et al 1989 report:

...This assessment (Summers et al 1989) was based on population and ecosystem modeling (equivalent adult model; production foregone model, and spawning/nursery area of consequence model) to determine the environmental consequences of impingement and entrainment. The results of these models evaluate the combined losses associated with both impingement and entrainment. Using conservative assumptions to estimate OCNGS impingement and entrainment losses, data available on population sizes, and survival rates and trophic relationships, Summers et al. (1989) concluded that population losses were rapidly compensated for by reproduction (e.g. sand shrimp), were a small fraction of the bay population (e.g., blue crab and winter flounder), or had little effect on higher trophic levels (e.g., bay anchovy and opossum shrimp).

Although NJDEP (2005) acknowledged the Summers et al. (1989) conclusion that OCNGS did not appear to produce "unacceptable, substantial long-term population and ecosystem level impacts," the agency stated that it is not necessary to prove that an impact on a population is occurring to require the applicant to meet Section 316(b) performance standards....

While this excerpt is not incorrect, it is important to reference relevant regulatory changes that have occurred since the release of the Summers et al report in 1989 and the resulting 1994 NJPDES permit that provide the background for this position as contained in the draft NJPDES permit. Due to the fact that the EPA Phase II section 316(b) regulations focus on plant data (i.e. impingement and entrainment data), biological monitoring that feeds into any assessment of effects to bay-wide populations is not directly relevant for the purposes of the Phase II section 316(b) regulations at this time. Prior to the release in 2004 of the EPA Phase II section 316(b) regulations, a study of any effects on biological populations was a focal point of the document entitled Draft Guidance for Evaluating the Adverse Impact of Cooling Water Intake Structures on the Aquatic Environment: Section 316(b) P.L. 92-500 (U.S. EPA, 1977). In contrast, the 2004 EPA Phase II section 316(b) regulations uses a reduction in impingement and entrainment as the metric for complying, where in some compliance alternatives the goal is the attainment of national performance standards, and impacts to populations are not considered.

As described in the Department's comments to EPA Headquarters on the draft Phase II section 316(b) regulations, the Department expressed concern about a population focus as opposed to a focus on impingement and entrainment effects. This was due to the fact that results of biological population studies and modeling can be very subjective because it is difficult to identify, measure, and attribute the impact of each of the many variables (e.g. fishery regulations, climate effects) affecting populations of each of the impacted species. Rather than engage in this kind of biological debate, time and resources would be better spent focusing on the magnitude of the impingement and entrainment losses in relation to the

costs and benefits of implementing various technologies to avoid or minimize the impact.

The Department agrees that biological data is useful in monitoring the health of the estuary and acknowledges that both plant-related data and biological data of Barnegat Bay are dated. Nonetheless, the Department determined that this data was sufficient for the purposes of developing a section 316(b) determination in its 2005 draft NJPDES permit. The Department hereby questions USNRC if adequate data is typically found at other power plants that are the subject of a license renewal.

Comment: As written the statement that there is no "clear" definition could be misconstrued to an understanding that there is "no" definition for calculation baseline or that any such definition is implied. Because the Phase II regulations do specify a definition for calculation baseline at 40 CFR 125.93, it would be preferable to state that the definition contains ambiguity. In addition, the word mortality should be stricken to be consistent with the wording in the national performance standards as contained at 40 CFR 125.94(b)2. Suggested changes are as follows:

The entrainment performance standards in the EPA's Phase II regulations requires that entrainment mortality for all life stages of fish and shellfish be reduced by 60 to 90 percent from the calculated baseline, although there is ~~no clear definition of~~ ambiguity as to how the baseline is to be calculated....

Comment: On page 12 of the draft NJPDES permit, the Department states that closed-cycle cooling and restoration are the only means available at this time to reduce or offset entrainment losses. As such, the following statement should be clarified to be consistent with the draft NJPDES permit:

Based on the results of this and other studies, the State of New Jersey may require additional mitigation measures, such as the installation of cooling towers or restoration, to reduce or offset entrainment....

#### **Page 4-16**

Comment: Because restoration was specified in the draft NJPDES permit as a viable means to offset entrainment and would be conducted at a separate location than the facility itself, this statement should be clarified as follows to be consistent with the draft NJPDES permit:

Regardless of the determination of impact, compliance with EPA's Phase II regulations may require modifications to the facility and/or the implementation of restoration measures.

Comment: It is important to make the distinction that there is no definition of adverse environmental impact contained in the Phase II regulations. This statement should be clarified as follows:

While adverse environmental impact is undefined in the Phase II regulations, † impingement of fish and shellfish into the cooling-water system is a potential adverse environmental impact.

Comment: These sentences as written are factually incorrect in their description of the Phase II regulations and required compliance with such. Specifically, only two of the five compliance alternatives contained in the Phase II regulations require compliance with national performance standards and the word “losses” should be substituted with “mortality” to ensure consistency with the wording in the national performance standards. Suggested wording is as follows:

This rule allows for five compliance options where two of these options concern the attainment of—The new performance standards are designed to significantly reduce impingement mortality losses resulting from plant operation. Licensees are required to demonstrate compliance with the Phase II regulations performance standards at the time of renewal of their NPDES permit.

Comment: Because restoration was specified in the draft NJPDES permit as a viable means to offset entrainment and would be conducted at a separate location than the facility itself, this statement should be clarified as follows to be consistent with the draft NJPDES permit:

As part of the NPDES renewal, licensees may be required to alter the intake structure, redesign the cooling system, modify station operation, or take other mitigative measures, which could include restoration measures, as a result of this regulation.

#### **Page 4-19**

Question: It is unclear from the following statement as to who’s conclusions are summarized in the paragraphs that follow this section and the age of any documents and/or data reviewed.

The NRC staff also compared its assessment of impacts with the conclusions stated in Kennish (2001), because the author has reviewed most of the information available to the NRC staff. A summary of the conclusions associated with impingement impacts follows.

#### **Page 4-21**

Comment: As stated previously for page 4-15, the following statement that there is no “clear” definition of calculation baseline could be misconstrued to an

understanding that there is "no" definition for calculation baseline or that any such definition is implied. However, because the Phase II regulations do specify a definition for calculation baseline at 40 CFR 125.93, it would be preferable to state that the definition contains ambiguity as follows:

The impingement performance standards in the EPA's Phase II regulations requires that impingement mortality for all life stages of fish and shellfish be reduced by 80 to 95 percent from the calculated baseline, although there is ~~no~~ clear definition of ambiguity as to how the baseline is to be calculated....

#### **Page 4-22**

Comment: Because restoration was specified in the draft NJPDES permit as a viable means to offset entrainment and is separate than modifications to the facility, this statement should be clarified as follows to be consistent with the draft NJPDES permit:

Regardless of the determination of impact, compliance with the EPA's Phase II regulations may require modifications to the facility or the implementation of restoration measures.

Comment: Because the operating license for OCNGS expires on April 9, 2009, this statement contains erroneous dates for the expiration date of the operating license.

The fact sheet describes the principal facts and the significant legal and policy issues considered by NJDEP during the preparation of the draft permit that will govern activities at OCNGS until the permit expires on April 30, 2009 (the same date month that the current OL for OCNGS expires).

#### **Page 4-23**

Comment: The statement regarding violation of surface water quality standards, and thereby necessitating a thermal variance, was not contained in the July 19, 2005 fact sheet but rather was contained in the 1994 NJPDES permit fact sheet. Therefore, this statement should be modified as follows:

The results of the overflights demonstrated that the thermal plume extent and width often violated State surface-water quality standards, thereby requiring a thermal variance, as described in the NJDEP (1994 2005) fact sheet.

#### **Page 4-24**

Comment: On page 4-24, the following is stated:



Summers et al (1989) also were critical of the hydrodynamic modeling conducted to support the 316(a) demonstration and concluded that the two-dimensional steady-state mass and heat balanced model used "...was a poor reflection of the dynamic conditions characterizing Barnegat Bay" and that "... the modeling regime chosen does not represent the best available methods for evaluating plume characteristics."

The NRC staff's conclusion is that the analysis conducted by Summers et al. (1989) provided the most realistic and complete description of thermal impacts associated with OCNCS and was taken into account during the NJDEP's development of the draft NJPDES permit.

The Department agrees that the Summers et al (1989) report did indeed recognize these shortcomings of the Section 316 demonstration. However, it seems as if the conclusions from the Summers et al (1989) report regarding the thermal discharge are missing and should be included prior to including the NRC staff's conclusion. Specifically, on page VIII-1 of the Summers et al (1989) report the following is concluded:

The Oyster Creek NGS does not comply with NJDEP's Surface Water Quality Standards for thermal discharges. However, present discharge effects are small and localized and have no adverse consequences to Barnegat Bay.

And, on page VIII-3 of the Summers et al (1989) report:

Based on the findings summarized in this report, balanced indigenous populations of Barnegat Bay are protected under Oyster Creek NGS's current operations (maximum BTU/hr of  $5.42 \times 10^9$ ). Therefore, if the designated heat dissipation were increased to the area currently occupied by Oyster Creek NGS's thermal plume, Barnegat Bay populations would continue to be protected,...

It seems appropriate to include some of these conclusions of Summers et al (1989) in this section.

#### **Page 4-45**

Comment: The Department agrees that sea turtles are impinged at the OCNCS intake structure and has confirmed that the data presented in Table 4-13 is correct. However, information contained on page 4-52 is also relevant to this section and should be included as follows to ensure a full understanding of the issue:

Most impinged turtles at OCNCS are impinged on the trash racks associated with either the circulating-water or dilution-water intake systems. In many cases, the dead sea turtles captured at OCNCS appeared to have died elsewhere, and in

some cases, dead sea turtles exhibited wounds consistent with injuries from small boat propellers...

Comment: A date should be included in the below excerpt to include a date as to when OCNGS procedures were revised.

Past difficulties in the preparation, storage, and shipping of turtles for necropsy have resulted in the loss of important data concerning the cause of death; recently, however, OCNGS procedures have been revised on [insert date] to correct these problems.

### Page 8-2

Comment: This sentence as written is factually incorrect in its description of the Phase II regulations and required compliance with such. Specifically, only two of the five compliance alternatives contained in the Phase II regulations require compliance with national performance standards and the national performance standards require a reduction in "impingement mortality" which is distinctly different than a reduction in "impingement". Suggested wording is as follows:

The EPA's Phase II regulations ~~call for reducing~~ establish five compliance alternative where two of these alternatives concern the attainment of a reduction in impingement mortality ~~the number of organisms impinged~~ at the intake structure by 80 to 95 percent of baseline, and reducing organisms entrained through the cooling system by 60 to 90 percent of baseline (EPA 2004a).

Comment: This sentence as written does not accurately represent the NJDEP draft fact sheet. Specifically, NJDEP included a statement that the second alternative could only be pursued if closed-cycle cooling was "unavailable". Suggested wording is as follows:

The NJDEP indicated that if AmerGen Energy Company, LLC (AmerGen), can demonstrate that a closed-cycle cooling system is unavailable ~~not a feasible alternative~~ for OCNGS, AmerGen could implement another alternative, which is to "select, install, properly operate, and maintain a combination of design and construction technologies, operational measures, and/or restoration measures that will, in combination with any existing design and construction technologies, operational measures, and/or restoration measures" endeavor to meet the national performance standards for impingement and entrainment.

### Page 8-3

Comment: This characterization of the second alternative as contained in the NJDEP draft permit fact sheet is incorrect. The second alternative does not only require restoration measures, but also requires improvements at the intake structure. In addition, while the Department made reference to wetlands

restoration as a viable restoration alternative, the Department did not limit the permittee to only this alternative. In addition, restoration measures are defined broadly in the EPA Phase II regulations. Restoration measures at OCNGS could include restoration measures, fish ladders, restoration of shellfish beds, preservation of lands etc. Changes are suggested as follows:

The second alternative considers a requirement to implement restoration measures, which could include the restoration of restored wetlands, coupled with improvements to the existing intake structure and operations.

#### Page 8-7 and 8-9

Comment: In Table 8-1 a SMALL TO MODERATE rating is given for land use impacts associated with the modified existing once-through cooling system with restoration alternative. Likewise, in Table 8-, a SMALL to MODERATE rating is given for the historic and archeological resources category as follows:

Short-term adverse impacts to terrestrial resources would result from restoration activities and could range from SMALL to MODERATE, depending on location and size of the site chosen. Long-term benefits to terrestrial resources from restoration are anticipated.

A potential "MODERATE" rating for both these categories seems overly conservative. The implementation of any restoration measures would inherently involve careful consideration by the Department of appropriate lands and a minimization of any negative effects to any affected species. A "MODERATE" rating seems to assume that these factors will not be considered.

#### **Page 8-9**

Comment: For the water use and quality category in Table 8-1, the Department has determined that it is premature and inappropriate to characterize all impacts on water use and quality as "small". As noted in the next statement, cooling tower blowdown would contain concentrated levels of chlorine and biocides that may not be used in the current once through system and may not necessarily result in an overall improvement in current surface water quality. However, the Department does agree that the implementation of cooling towers would result in a reduction of heat loading. To address this issue, this statement should be modified as follows:

Heat impact on surface water would be reduced from current level. Cooling-tower blowdown containing increased dissolved solids and intermittent low concentrations of biocides would be released; however, they would be diluted with the dilution-pump system.

**Page 8-10**

Comment: In the socioeconomics category, there is no mention of benefits to tourism that may result from any restoration alternative.

**Page 8-12 – 8-13**

Comment: The Department agrees that any reduction in impingement losses via a closed-cycle system as compared to a once-through system would depend on the species affected. However, it is not clear from this excerpt how this conclusion can be drawn. The following language is suggested to help bridge this gap in understanding:

Although impingement would be substantially reduced by using a closed-cycle this system, if it is assumed that a reduction in flow results in a corresponding reduction in impingement and entrainment, which is suggested by EPA in its preamble to the Phase II regulation, it is reasonable to assume that impingement would be reduced by 70 percent. However, because a closed-cycle cooling system does not require Ristroph traveling screens and therefore all organisms impinged would be killed, there would not necessarily be an overall reduction in impingement mortality via a closed-cycle cooling system as compared to the current system. Specifically, current documented levels of impingement survivability for Representative Important Species with the Ristroph traveling screens are around 88% which is higher than 70%. Therefore, impingement mortality could be greater with the closed-cycle cooling system. Any, the reductions in impingement losses would only be evident for those species known to have high impingement mortality (e.g., bay anchovy [Anchoa mitchilli], Atlantic silverside [Menidia menidia], and Atlantic menhaden [Brevoortia tyrannus]; see Section 4.1.2). Species with low impingement mortality (winter flounder [Pseudopleuronectes americanus], sand shrimp [Crangon septemspinosa], and blue crab [Callinectes sapidus]) would be less affected by this alternative. The reduction in flow may also reduce sea turtle impingements....

**Page 8-24**

Comment: This sentence as written is factually incorrect in its description of the Phase II regulations and required compliance with such. Specifically, only two of the five compliance alternatives contained in the Phase II regulations require compliance with national performance standards.

The NJDEP identified construction and operation of a closed-cycle cooling system (Section 8.1.1) as its preferred alternative to demonstrate compliance with Section 316(b) regulations meet national performance standards for impingement and entrainment losses.

Comment: The excerpt below has several incorrect references to either the draft NJPDES permit or the EPA Phase II regulations. First, as stated above for page 8-3 referenced above, restoration measures in the draft NJPDES permit are not limited to only the restoration of wetlands since restoration measures are defined broadly in the EPA Phase II regulations. Secondly, the entrainment performance standard is compared against baseline conditions which should be referenced as it was for the impingement performance standard. Third, it would have been inappropriate for NJDEP to have included specific information in the draft NJPDES permit about viable operational or design changes to reduce impingement and entrainment given the fact that the EPA Phase II regulation requires for this information to be submitted in a Comprehensive Demonstration Study that is due on January 7, 2008. This should be appropriately referenced. Suggested changes are as follows:

This alternative would reduce impingement and entrainment losses by retrofitting the existing system with improved technology, altering operations of the system, and ~~restoring wetlands~~ the implementation of restoration measures within Barnegat Bay to meet national performance standards that require 1) reduction in impingement mortality for all life stages of fish and shellfish by 80 to 95 percent from baseline conditions, and (2) reduction in entrainment for all life stages of fish and shellfish by 60 to 90 percent from baseline conditions. In describing this alternative, the NJDEP ~~provided little information regarding operational or design changes that might be employed at OCNGS to reduce impingement and entrainment losses~~ acknowledged that there are limited design and construction technologies available to reduce entrainment at this time. An identification and analysis of appropriate design and construction technologies is due to NJDEP as part of a Comprehensive Demonstration Study in accordance with the deadline of January 7, 2008 as set forth by EPA in its Phase II regulations.

#### **Pages 8-24 – 8-25**

Question: What is the source of the information to support the below excerpt? The Department is unaware of any recent analyses of these technologies for the site-specifics of OCNGS. Any source or indication of whose conclusions these are should be included.

Other possible modifications to the system that might reduce impingement include utilizing a newer traveling screen design (e.g., a multidisc screen system), installation of an acoustic deterrent system for fish, and optimization of the existing fish-return system to reduce damage to fish. The effectiveness of these technologies or operational changes in reducing entrainment and impingement is uncertain. As stated above, none of these alternatives are expected to reduce losses by even 50 percent.

**Page 8-25**

Comment: The below excerpt concerning NJDEP's identification of 103 high priority sites is somewhat vague and should be made more specific. Suggested changes are as follows:

In its draft NJPDES permit for OCNGS, the NJDEP referenced the 1995 The Trust for Public Land's report entitled "The Century Plan: A study of One Hundred Conservation Sites in the Barnegat Bay watershed" identified 103 high-priority sites within the Barnegat Bay watershed that could be considered by AmerGen for restoration.

**Page 8-55**

Comment: Any new coal plant, as discussed in the below excerpt, would be required to meet Phase I of EPA's section 316(b) regulations which applies to new facilities. The requirements for Phase I are significantly greater than those requirements for Phase II facilities and should be taken into account in any rating of impacts. This is corrected as follows:

This section discusses the environmental impacts of constructing and operating a coal-fired plant using once-through cooling. The impacts (SMALL, MODERATE, or LARGE) of this option are similar to the impacts for a coal-fired plant using the closed-cycle system. However, there are minor differences in impacts between the closed-cycle and once-through cooling systems. Table 8-4 summarizes these differences. The design and operation of the intake would need to comply with Phase I ~~Phase II~~ performance standards of the EPA's section 316(b) regulations to minimize adverse impacts associated with water withdrawal and heated discharges would need to comply with Section 316(a) regulations.

**Geology And Ground Water**

The NJDEP's New Jersey Geological Survey has reviewed the Draft GEIS from the standpoint of geology and ground water. Below are some comments, section by section. Additionally, pages 80 to 83 of the testimony comments on the water diversion. Some of the comments below may actually answer some of those concerns.

**Section 2.2.2, Water Use**

Page 2-19 fourth paragraph, indicates the two production wells on site have a water use registration for users of less than 100,000 gallons of water a day (gpd). On page 81 of the comments from the public hearing it is indicated that the statement was incorrect. The person making the comments indicated that it was the installation of equipment that could divert more than 100,000 gpd, which required a permit. A check of the water supply permits indicates that

Amergen Energy Co. has a "Water Use Registration" 11108W. Water Use Registrations are for systems that have the potential to exceed the 100,000 gpd due to the size of the pumps or the number of wells in the system but their use is under 100,000 gpd on a 30-day average.

The last paragraph, of the same page, states over the year that the usage is only 14gpm. It seemed unusual to site usage in this way. On page 2-20, second sentence, they indicate that extraction wells for the ground water remediation are discussed in Section 2.2.3. Yet in Section 2.2.3 here is no mention of the amount of water pumped by the ground water extraction system. If ground water is being pumped for the clean-up technically, those amounts should added into the plant Water Use Registration totals but there is no indication on the registration that there is any ground water pumping for a clean-up. If the 30-day average exceeded 100,000 gpd, then they would need a Water Allocation Permit.

It was not clear why the report made so much of the amount of water pumped at 14 gpm until page 4-43 was examined. There it is stated that "Plants using less than 100 gpm are not expected to cause any groundwater conflicts." The next paragraph indicates that as discussed in Section 2.2.2 the use is less than 100 gpm and "The NRC staff has not identified any new and significant information during its independent review of the AmerGen ER, the site visit, the scoping process, or the evaluation of other available information. Therefore, the NRC staff concludes that there would be no groundwater-use conflicts during the renewal term beyond those discussed in the GEIS."

#### **Section 2.2.8.2, Public Services, Water Supply**

Some of the numbers on Table 2-9 maybe outdated. For instance, United Water has exceeded it allocation several times and has been trying to get an increase. They have activated their interconnection with Lacey Township MUA to supply some of their additional water requirements. Nowhere is a listing of other ground water diversions such as the Jersey Central Power & Light diversion.

#### **Section 4.5, Groundwater Use and Quality**

This section indicates there are no groundwater-use conflicts, which seems to be based on the plant not pumping more than 100 gpm. Actually when the wells are pumping they each exceed the 100 gpm since they have 200+ gpm pumps. Also they cite "NJDEP 2005a" for pass-through cooling water for some pumps. This fact sheet on the discharge permits for the plant discusses some of water use for the plant. In the report, on a diagram of the water flows at the plant, the South Well is shown. For the South Well, it is indicated that the flows from the well can range from 3,000 to 103,700 gpd. The Draft GEIS does not show the North Well on the diagram. What also is not indicated there or in the report is the

any amount of ground water pumped by the ground water clean-up system. Another ground water pumpage at the plant site, which possibly may be used by the plant, is under Water Allocation Permit 2164P. This permit is for Jersey Central Power & Light and has a maximum rate of 1,100 gpm and 7.95 million gallons per month. The first three wells listed on the permit are DW-1, DW-2 and SW-1 which were drilled for the Oyster Creek Nuclear Plant in 1971 and 1973 to supply water to the plant. These wells are still permitted in the latest diversion permit for JCP&L after the selling the plant to AmerGen even though they were for plant water supply. It is not clear why JCP&L would have kept them under their permit since it is likely they still are interconnected to the plant. We doubt the original piping was removed after the sale of the plant. Is or can water pumped under the Jersey Central Diversion be used by the AmerGen plant? If so, then the fact that AmerGen reports 14 gpm averaged out over the year is moot. They could be using and pumping significantly more water from the site since it would be reported under a different diversion. Also there is no quantity being pumped for the ground water clean up.

Based on previous records, at times the plant can and will use more water than the AmerGen Water Use Registration permits. The records show in the 1990's there was at least one time the plant exceeded its monthly diversion of 7.95 mgm. It is not clear why they used that much water, but if the same conditions occur again the plant would likely use similar amounts of water

#### **Section 4.8.5, page 4-55**

The report again indicates that the plant water use of only 14 gpm is inconsequential and is well below the GEIS Category 2 threshold for ground water use of 100 gpm. Then at the bottom of the page they again state "... the NRC staff concludes that the cumulative impact on groundwater resources through water usage would be SMALL, and that additional mitigation would not be warranted." This statement cannot be evaluated until all the ground water pumpage and use at the plant quantified as discussed above under Section 4.5.

Section 8.1.1.2, pages 8-14 & 8-15- The report indicates that during the construction of a closed-cycle cooling system the ground water usage would be negligible. They indicate that the water requirements, for potable water for the additional workers and for concrete was mixed on site, would be short and not exceed the existing registration. They also indicate that the underground parts of the construction would create a need for localized dewatering and require a permit.

First, during construction there is significantly more water use during construction than for potable water and for concrete. Significant amounts of water are used at construction sites for cleaning equipment as well as dust control. Also the construction would likely continue for months.



Second, the dewatering would require a diversion permit as the report indicates, but in aquifers like the Cape May and Cohansey (depending of the depth of any construction) the pumpage would be in the hundreds to thousands of gallons per minute. For the footing for the uncompleted Forked River Station the dewatering was pumping over 16,000 gpm. I do not know how deep the footings for cooling towers would have to go, but most likely they would be significantly below the water table. Also if there was any contaminated ground water in the area of construction most likely there would be some treatment and/or monitoring requirements attached to the permit.

### **Land Use**

The NJDEP's Division of Land Use Regulation (DLUR) review comments follow.

#### **Page 2-22, lines 10-16**

The following statement appears, "Dredging of Oyster Creek and the Forked River is administered by the U.S. Army Corps of Engineers (USACE) and a Coastal Area Facility Review under the New Jersey Coastal Zone Management Act. Suction dredging has been performed to minimize the impact of the dredging, and dredged materials have been conveyed to the dredge spoils basin (Figure 2-3) using hard piping. During the license renewal period, periodic dredging may take place in the intake and discharge canals, the Forked River, or Oyster Creek. The dredging would be consistent with past techniques and requirements."

Please be advised the permit required for dredging from the NJDEP would be a Waterfront Development Permit under New Jersey's Waterfront Development Law and not a Coastal Area Facility Review Act (CAFRA) Permit.

#### **Page 8-8, Lines 2-6**

The following statement appears, "Construction of the cooling towers at the OCNCS is under the jurisdiction of New Jersey's coastal management program within the NJDEP's Division of Land Use Regulation. Current restrictions under the requirements of the New Jersey Coastal Area Facility Renewal Act (CAFRA) limiting the percentage of impervious surface area for Lacey Township preclude the construction of the cooling basin and towers (AmerGen 2006)."

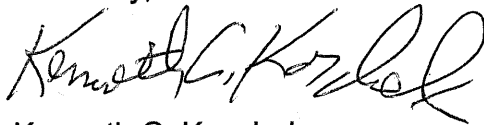
It appears the applicant (AmerGen) is referring to New Jersey's Coastal Zone Management Rules (Rules, N.J.A.C. 7:7E-1.0 et. seq.), specifically to the Subchapter 5 Rules with regard to impervious coverage at a proposed project site. The applicant is correct the proposed facility would require a Coastal Area Facility Review Act (CAFRA) Permit. However, the Division is not aware of any

guidance given to the applicant as to whether Subchapter 5 Rules would "preclude the construction of the cooling basin and towers." In fact, the Division has met with the applicant to discuss placement of additional impervious coverage on the site at or in close proximity to the location the towers would be placed at. (See Figure 8-1) During the meeting, the Division provided guidance on a way to comply with impervious coverage rules.

Therefore, the Division requests the above cited statement; the statement in Table 8-1, Line 15; and any similar reference to Subchapter 5 impervious coverage rules be removed as not factual, unless there is documentation demonstrating the Division has previously advised the applicant that the percentage of impervious surface area would preclude the construction of the cooling basin and towers. If such documentation exists, then the Division reserves the right to review and comment on those document(s).

Thank you for giving the NJDEP the opportunity to comment on the document.

Sincerely,



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